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DEVELOPMENT AND PURPOSE

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DEVELOPMENT AND PURPOSE

AN ESSAY TOWARDS
A PHILOSOPHY OF EVOLUTION

BY

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IN MEMORY OF NORA HOBHOUSE

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NOTE TO FIRST EDITION

I HAVE avoided the overloading of this volume with references to authorities, but my debt to many contemporary writers will be sufficiently clear to the reader. I must, however, express my very special obligations to my colleagues, Dr. A. Wolf and Dr. T. Percy Nunn, both of whom carefully criticised the manuscript and suggested many important modifications. Dr. Wolf has also read the whole of the proofs, and Dr. Nunn has given me an expert's aid in the chapter in which I have had to refer to mathematical method. Neither of my friendly critics, however, are responsible for the final form of the text, and any errors or failings that are detected in it must be imputed to myself.

L. T. H.

NOTE TO REVISED EDITION

IN preparing this book for reissue I have taken the opportunity of reconsidering the whole theory in the light of the many changes which intervening years have brought. The bearing of these changes is briefly indicated in the Introduction. The result is that the first part of the book is maintained with substantial modifications of detail. The second part has been in the main rewritten. In the final revision I have to thank Professor A. L. Bowley for valuable criticisms of the chapters dealing with Method and especially with Probability, Dr. Ginsberg for a thorough examination of my main argument, and Mr. A. W. Perris for help in revising the proofs.

L. T. H.

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The principal stages to be distinguished in the development of human ethics are: (1) Custom, in which the impartial moral judgment is imperfectly formed. (2) Law and morals, in which categorical rules are established. (3) Religious idealism, which sets up a complete system of life, without regard to the actual conditions of development. (4) Realism, which reconstructs the system by relating it to the final meaning of development. (5) A rational account of morals was first attempted by the Greeks, but did not in their case start from a generally accepted spiritual religion. (6) Such a religion formed the starting point of the modern reconstruction, which has to reconcile the claims of the spiritual order on the individual conscience with the working life of society. (7) This leads to the conception of the harmonious development of man in society as the basis of the ethical order, (8) and to the conception of the spiritual as the moving force in this development. Pp. 152–187

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INTRODUCTION

The field covered in this volume is wide and the treatment in many parts is necessarily short and summary. In justification it must be said here that the book completes a scheme which has occupied the writer for twenty-six years and has been carried through successive stages in three previous works. But in the meantime it was inevitable that the scheme itself should change and expand, and the precise aim of this final instalment will therefore be most readily explained by giving a slight account of the manner in which the subject developed in the writer's mind during the somewhat extended period in question.

In the middle of the "Eighties," when the writer was first studying philosophy, the biological theory of evolution was already very generally accepted, and the philosophical extension of the theory by Mr. Herbert Spencer was, except in academic circles, in the heyday of its influence. Philosophically Mr. Spencer was not a materialist. But his metaphysical safeguards did not rescue the evolution theory from some of the most unfortunate consequences of a materialistic system. Evolution, as thus interpreted, meant, in its bearing on human life and action, essentially two things. It meant that the human mind must be regarded as an organ like the lungs or the liver evolved in the struggle for existence with the function of adjusting the behaviour of the organism to its environment. It was to be thought of (the conception is set out more fully in Chapter I.) as a sort of glorified reflex action. Cunningly constructed as it was, it had no special significance in the evolutionary scheme, and though it made man for a time the dominant animal, yet the ultimate goal of its efforts would be to establish an equilibrium which would prove, as Mr. Spencer candidly admitted, the first stage of decay. The Genus Homo had its place in geological time like other genera, and like them would pass away, only unlike them its fossil remains would never become a theme for the antiquary, because in the cooling of the earth there would be no antiquarians. The teeming life of the world must gradually disappear and give place in time to the primordial silence.

The appearance of an upward process in evolution then was illusory. It was due to the position of the human observer, who could not clearly see beyond the segment of the whole curve on which he himself happened to be placed. This result was more fatally apparent when the conditions of evolution were taken into account, and these bring us to the second point at which the theory affected human life and action. So far as there was anything like progress, it was due to the internecine struggle for existence. But a little reflection suffices to show that if progress means anything which human beings can value or desire, it depends on the suppression of the struggle for existence, and the substitution in one form or another of social co-operation. There was here a conflict between the scientific and the ethical points of view which threatened social ethics with extinction. The contradiction was masked indeed for Mr. Spencer by his theory of the inheritance of acquired qualities, and it was not until Weismann insisted on the all-sufficiency of natural selection that it assumed its extremer form. But the social implications of natural selection were already apparent before Weismann's work acquired its ascendency and were so far accepted by Mr. Spencer as to be made the basis of an uncompromising economic individualism. This assertion of individualism coincided with the beginnings of a new demand for the extension of collective responsibility and the social control of industrial life. Economically the old individualism was dying, and apart from the evolutionist school, it was clear to thinking men that the idea of liberty required a new definition. Such a definition was propounded by T. H. Green, whose influence, together with that of the late Master of Balliol, was dominant in Oxford and in the English and Scottish Universities generally in the Eighties and early Nineties. In this philosophy there seemed to many to be a way of escape not only from a barren individualism but from the whole philosophy of evolutionism. An adaptation of German metaphysics, a modified Hegelianism, or a form of Kantianism in which what was best in the Hegelian criticism was incorporated, might maintain itself against science and justify a spiritual conception of human life and of the entire world order. This method, however, to speak frankly and quite personally, I could never accept. Apart from all difficulties of detail, two things always seemed clear to me. One was that the attempt to regard reality as all spiritual was as fatal to clear thinking and to the most cherished ideas of the Idealist himself as Materialism. When everything is spiritual the spiritual loses all distinctive significance, and none of the shifts by which idealism explains error and evil have ever seemed to me to turn or even to approach the central difficulty. My second conviction was that the philosophy of the future must make its account with science. Whatever the limitations of scientific method and the faults and even the blindness of scientific specialism, the plan of building from the foundations of experience, the principle of working piecemeal and admitting the broken and incomplete character of knowledge was and is for me sounder than the method of constructing a complete and rounded system at a stroke by some brilliant, perhaps too brilliant, piece of analysis. Metaphysical analysis clearly had its function in setting out and co-ordinating the underlying ideas of science and of experience generally. But I could never accept the view that the whole work of science was of secondary importance, that it could go on constructing its world as it chose, but that whatever its results, a metaphysical analysis would always be able to interpret the entire scientific scheme on its own lines. Doubtless metaphysical analysis and scientific specialism have each its sphere, but they cannot maintain an attitude of mutual indifference to the end. Neither is all-embracing, and a true philosophy, a really concrete interpretation of our experience as a whole, must aim rather at a synthesis in which the analysis of first principles figures as the keystone of the arch of science. In this respect Mr. Spencer, whatever the defects of his method, seemed to me to have been justly inspired. But for a long time I did not imagine the function of philosophical criticism to be anything but critical and negative. It was not till much later that I came to think that it might yield certain sound generalisations as to the nature of reality, and I confess I should not even now attach more than a speculative importance to such generalisations if they were not corroborated by a synthetic view of experience.

In the meanwhile I was convinced that a philosophy that was to possess more than a speculative interest must rest on a synthesis of experience as interpreted by science, and that to such a synthesis the general conception of evolution offered a key. The immediate question was whether it was possible to overcome the contradictions of that theory as applied to human progress. At this point, philosophical criticism offered a suggestion. The idealistic writers continually insisted on the special features which distinguish human consciousness, and as the later development of psychology has shown, many of their contentions were empirically sound, even if they could not carry the whole weight of the metaphysical superstructure placed on them. Green's permanent self-consciousness, for example, if it is not a spiritual principle, eternal or timeless, is an empirical fact within the world of time. It was the temptation of an empirical, and in particular of an evolutionary psychology, to explain away these higher developments of mind, to level distinctions of kind, and so reduce all mental phenomena as nearly as might be to the same level. This, I thought, might be the root of the trouble, and I conceived that if the mental or spiritual side of evolution were treated quite dispassionately, without any attempt to minimise differences of kind, but setting them out impartially and using them to measure the length of line which by whatever means evolution had somehow traced out, a very different interpretation of the whole process might be reached. As I followed this line of thought, it seemed to me that, details apart, the Hegelian conception of development possessed a certain rough, empirical value. There were grades or degrees of consciousness and self-consciousness, and as personal self-consciousness was distinctive of man, so there was a higher self-consciousness of the human spirit, which would represent the term of the present stage in development. Further, if this conception was interpreted in terms of experience, it indicated a point of union, where one would not expect to find it, between the Idealistic and the Positivist philosophy. This higher self-consciousness would be the Humanity of Positivism, regulating its own life and controlling its own development. But further, if this was the true empirical account of Evolution, our interpretation of that process would be fundamentally changed. The factor of consciousness, as the late Professor Ritchie was already insisting, would influence the course of development. If my view was right it would turn out even to be the central point in development. To the fully conscious mind in man everything would lead up, and from it, once formed, all future movement would be derived. This was indeed to assume that along with knowledge there would go control, but in the first place it could, I thought, be shown that control extends in a kind of geometrical ratio with each new turn in the development of consciousness, and in the second place, as the full meaning of the self-conscious mind worked itself out it was seen to imply a grip on those underlying conditions of life which, as long as they remain obscure, thwart human effort and distract man from that social collaboration which is necessary to the greatest efforts.

By emphasizing consciousness and its control moreover, several difficulties as to the relation of evolution and progress could be met. To begin with, it was possible to conceive of evolution in general as a blind and even brutal process, dependent on the anarchical struggle for existence, but to maintain that in the course of this struggle there had arisen among other species one which owed its survival to a mind. How this had happened was not for the moment the point. It had happened, and there was a being with a mind, looking before and after, and also looking around him upon his fellows and on the whole, working with as well as against them. Something of this mind moreover existed in lower species, and it was important to notice that even there, in proportion as mind began to exert itself, it tended to supersede the struggle for existence. It was possible to display one particular line of evolution, for which I afterwards found Mr. Sutherland's expression "orthogenic evolution," as a series of advances in the development of mind involving a parallel curtailment of the sphere of natural selection. The conclusion was clear that natural selection was not the cause of progress, if progress meant the advance of mind. But what was the cause of progress, how mind came into being, how it grew, what were the conditions of its further development, I did not at first enquire. I saw no light upon the question, and I thought that the empirical account leading up as it did to the control of life as a whole by consciousness was the most important or at least the first thing to prove.

There was a further difficulty with regard to human progress which could be met by emphasizing this factor. If it was admitted that man was something higher than the animals, it might easily be denied that modern man was anything higher than ancient man. Certainly if we take specially favoured races and epochs of the past for comparison, there is not the slightest proof of any advance in average human faculty. True, social progress does not necessarily require any improvement in the congenital qualities of the individual, and the question should be rather whether the collective achievement of mankind grows—in knowledge, religion, ethics, art, social organisation. But on all these points, with the exception of knowledge and its direct applications to industry, scepticism is abundantly possible, and it is easy to assert that there have been earlier epochs when religion was purer, social life better organised, men and women on the whole happier, and industry devoted to the production of more beautiful objects than sky-scrapers, factory chimneys, gigantic hoardings and aniline dyes. I was never one of those who think that the general fact of progress may be readily assumed, or that mankind constantly advances to higher things by an automatic law which can be left to itself. On the contrary, I believed that there was no upward tendency in things as such, that apart from the operations of the human mind, the struggle for existence ruled, that the sun of its favour shone impartially on the just and the unjust, and the east wind of its implacable severity nipped the buds of loveliest promise as readily as the garden weeds. Not only so, but until the mind should come into its kingdom man himself was subject to the same rule. The struggle for existence was not the cause of mind, but mind had to undergo the struggle for existence. Each animal species that relied on a dawning intelligence for its living had to maintain itself against others that might be harder of shell or stouter of limb. Each race of man that made some advance in ideas, in industry or the social arts had to fight for its place. There was no *a priori* reason to suppose that it would survive. Its mental development would be on the whole an advantage, but it would only be one advantage among many possibilities, and a higher birth-rate, a tougher hide, stouter muscles, or greater power of resistance to some microbe might easily turn the scale of any conflict in favour of a rival race of lower mental endowment. It was therefore clearly possible, and the historical record showed that it was the fact, that the higher type may often be beaten by the lower, and beaten to extinction so far as its achievements in civilisation are concerned. Only if mind should once reach the point at which it could control all the conditions of its life, could this danger be permanently averted. Now it seemed to me that it is precisely on this line that modern civilisation has made its chief advance, that through science it is beginning to control the physical conditions of life, and that on the side of ethics and religion it is forming those ideas of the unity of the race, and of the subordination of law, morals and social constitutions generally to the needs of human development which are the conditions of the control that is required. It seemed of secondary importance that there should have been little or no progress in other respects, provided that this essential condition of future advance had been realised.

The first object then, as it seemed to me, was to show that mental evolution had in point of fact consisted in a development of consciousness from stage to stage in the manner supposed. To do this would require a very wide examination on the one hand of animal psychology, on the other of the growth of human thought and of the social customs and traditions in which thought is embodied. But there were also problems of definition and analysis. Consciousness and self-consciousness are vague terms. If we are to distinguish phases of their growth accurate criteria are required, and the criteria should be such as are directly reflected in external behaviour. For in the case of animals we have nothing but external behaviour to go by. In the case of man our judgment has to be in large measure indirect, based on the implications of a custom or a belief, or even a phrase. In all cases it was an integral part of the purpose to determine not merely what consciousness was but what it effected. For these reasons I came to take the correlation which is effected in consciousness between different portions of our experience or between different acts and purposes as the basis of a classification. The starting point of this conception is exceedingly simple. If we utter a simple sentence we bring different words, and the words stand for ideas or elements of ideas, into relation. If we execute a purpose we bring a series of acts into relation with one another. It is by correlation that the mind introduces order and establishes its control. There is, however, in organic life a certain degree of correlation apparently independent of consciousness. Thus the several organs of the body act on the whole in concert, or, to take an instance of another kind, the successive operations of an instinct, *e.g.* the spinning of a spider's web are nicely correlated with one another, though we cannot assume that this adjustment is effected by intelligence. The term correlation therefore serves, first, as a *summum genus* under which all kinds of vital activity, conscious or unconscious, might be subsumed, and secondly, as a standard by which they might be compared, certain assignable differences in the method and scope of correlation yielding the required differences of type which are successively evolved. There was here a standard measure for the evolution of mind, and to carry it right through that evolution has been the principal task. It was worked out in some detail for animal psychology and for the transition to human faculty in *Mind in Evolution*, published in 1901. For human evolution the ethical side seemed most important, and this was worked out in *Morals in Evolution* five years later. The data are in all cases difficult to ascertain with precision, and the analysis has required constant overhauling and restatement.[1]

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[1] Animal Psychology had barely emerged as a science twelve years ago, and there was little then to rely upon beyond the pioneer work of Romanes and the judicious observations and careful reflections of Mr. Lloyd Morgan. Mr. Thorndike's experiments, however, had laid the foundations of a new method, which has been brilliantly developed by a series of American observers and experimentalists such as Profs. Yerkes, Jennings, Haggerty, Watson, Shepherd and many others. Animal Psychology as it stands may fairly be considered the creation of American science. I regret that owing to the extended field covered

The results are summarised, modified, and extended in the first part of the present work, the object of which is to state as definitely as possible what is involved in the evolution of self-conscious mind, and to show that this evolution has in fact proceeded by successive stages from the dawn of life to the rise of modern civilised thought.

In all this part of the work the method was rigidly empirical, or to use a descriptive, though not very desirable term, phenomenological. In fact in the two earlier works mentioned I confined myself almost entirely to a comparison of the actual content of each stage in development, avoiding theories of the nature of life and mind, and current controversies as to causation. The account should, I thought, hold true whether mental process should ultimately be resolvable into mechanical terms or not. It should also be independent of any theory of the ultimate nature of reality. There might or might not be an original purpose in things, but there was certainly an evolved purpose, and this purpose at its highest point of development would acquire a superhuman, a quasi-divine power. The genesis of this power could, I thought, be verified in experience, and that was a more solid ground than any metaphysical analysis. In point of fact I was at first opposed to anything like a theistic or teleological interpretation of reality as a whole, as inconsistent with the mechanical causation which I took to be the ultimate category of science.

There are, however, elements of fallacy in the purely

in this book I am unable to deal worthily at present with this new wealth of material, but it has naturally modified my old opinions on several points, as is briefly indicated in its place.

In comparative ethics again to the work of Post, Letourneau and Sutherland, which were the best available surveys ten years ago, should now be added the encyclopaedic researches of Dr. Westermarck, and it is hardly too much to say that this subject has also definitely entered the rank of the sciences.

empirical view, or at least in the inferences which I drew from it, which are set out here in Part I. Chap. XII. and the sense of this deficiency compelled me to take further account of the questions of causation which had previously been set aside. For this examination there was a starting point in some results which I had reached in following up another line of enquiry. To justify the empirical method it was necessary to examine the foundations of knowledge, in order to discover whether the postulates of the empirical view were self-consistent and self-sufficient. For this purpose, before beginning the systematic study of evolution several years were given to an examination of the *Theory of Knowledge* (1896). Working with the ideas of mechanical causation in this book, I was led to the conclusion that these ideas themselves imply at the end what might be called an organic conception of reality as a whole. But the organic seemed to me then as distinct from the purposive on the one hand as from the mechanical on the other. Not long after the book was published, however, some new considerations occurred which convinced me that this was an error, and that however much I might object to the form of their reasoning there was an element of substantial truth on this head in the reasoning of the Idealists. The result was to suggest that by mechanical reasoning from a purely empirical starting point a candid thinker would be led to admit an element of purpose in the system of Reality. It thus became important to connect this result with the empirical account of the growth of purpose.

This is the principal object of the present work, and the result, if the reasoning is sound, is to show a coincidence between the views derived from an analysis of the pre-suppositions of knowledge, and those attained by a comprehensive review of experience. The analysis suggests the operation of a conditioned purpose. The empirical account reveals the purpose in operation. Many difficulties remain which will be found freely admitted in the text, but it is submitted, not in the least as a matter of faith, but as a sound working hypothesis, that the evolutionary process can be best understood as the effect of a purpose slowly working itself out under limiting conditions which it brings successively under control. This would imply not that reality is Spiritual or the creation of an unconditioned mind—a view equally repugnant to morality and experience—but that there is a spiritual element integral to the structure and movement of Reality, and that evolution is the process by which this principle makes itself master of the residual conditions which at first dominate its life and thwart its efforts. It is of course true that the evolution whose story we know is confined to a single planet, but it is argued that this terrestrial evolution coincides in outline with the conclusions of an analysis that is applicable to reality in general. For further verification we must be content to await further enquiry.

The relation between the 'historical' and the philosophical argument will be further considered in Chap. I., but one point may be subjoined here. The conception of Mind and its evolution differs fundamentally in accordance with the position given to the rational element. Now in the history of philosophy it was the rational that first interested thinkers. They wished to know what was reasonable and why, both in thought and in conduct. Often, no doubt, they were led to speak as though thought were, and action ought to be, purely rational, and they neglected the study of the elements of impulse, instinct, feeling, emotion that made up the groundwork of human psychology. In recent years the pendulum has swung the other way. The irrational is the chief object of interest, one may almost say of adulation. Indeed it becomes almost difficult to get a hearing for any theory which still regards reason as a good name for that which distinguishes man from the lower animals. Everyone takes a pride in showing his superiority to mere reasoning, and there are some who are at least successful in demonstrating their freedom from any bias in favour of rational methods. The causes of this curious reaction would repay an investigation for which unfortunately there is not sufficient space here. In part it is due to the more concrete study of psychology and the prominence which any science, particularly in its more popular versions, is apt to give to newly opened territory. In part again it arises from the extraordinary discoveries of science itself, which have undoubtedly undermined many old categories, and seem to some to have made almost anything possible. Another factor is the old desire to be free of rational trammels, and create in imagination a world which will satisfy the craving of man—a desire which in these days fortifies itself with odds and ends from the psychology of faith-healing. For if faith can remove blisters, why should it not remove mountains? All this reaction is of purely temporary significance. Rational purpose is, and will always in the end be, recognised as the distinctive feature of the activity of mind, and though it may fairly enough be maintained that the mind is more than its purposes, and that the purposes themselves grow and take definite shape in the very process of execution, this is only to contend that the mind, as we know it, is still imperfectly aware of its self and its own meanings. It is to set one problem the more to the student of the evolution of self-consciousness. A mere vital impulse may blow like the wind where it listeth, so that none can tell whence it cometh or whither it goeth.

But creative or rather plastic mind is that which moves towards ends which are worth reaching, and because they are worth reaching. It gets a better view of them as it advances, not so much because they are nearer as because its own nature as mind is being all along developed by its activity and its experience, and this development means precisely that its purposes are clearer, more harmonious and more comprehensive.

To justify this view of mind it has to be shown that the postulates of logical thought are intelligible and self-consistent, that they form indeed a rational system. In the same way it is necessary to show in ethics not merely that there is a certain order which as a matter of fact is coming to prevail, but that there is a rational order. This task is attempted in the earlier chapters of Part II., and the evolution of mind is conceived accordingly as a progressive development of the rational both in thought and in action. The conception formed of rationality proves in fact to be the connecting link between the historical account of mental evolution and the philosophical theory of the ultimate basis and meaning of evolution. Three studies are thus closely linked, the history of mind in living beings, the validity of its rational processes, the position of mind in the structure of reality as a whole. In the position here adopted, the conception of reason is no doubt considerably widened. Neither in logic nor in ethics is the rational function confined to the apprehension or application of certain abstract ideas. It is conceived rather as a principle of harmony pervading experience and working it into an organic whole. So understood, reason is supreme in the mind simply as that which embraces every element of experience, interconnects every feeling and thought, takes account impartially of every suggestion and every impulse, and weaves of them all a tissue which is never ossified but always plastic and recipient. It is the conscious expression of that impulse to harmony which dominates the entire evolution of Mind, and the rationality of the process is the guarantee of its ultimate success.

INTRODUCTION TO REVISED EDITION

The years that have passed since this book was first published have been years of sweeping change alike in the world of practical affairs and in the world of science. To the philosopher it is of less moment that four empires have fallen than that the foundations of physics have been shifted, but to the theory developed here, resting one foot on historical evolution and the other on the analysis of knowledge, the changed outlook of civilisation is as important as the revolution in thought. One point in the evolutionary argument set forth in the original work was the attainment in modern civilisation of conditions which would render possible a rational control of future progress. This conception was indeed expressed with some caution and it was admitted that there were many possibilities of disappointment. Still it must be a matter of regret that some of these possibilities have been so liberally fulfilled that a doubt as to the future of Western civilisation must now be freely admitted. It might have been hoped that the great catastrophe in which the weaknesses of our civilisation had their issue might at least have settled fundamental questions. Those who cherished this dream have had to learn once again that war which settles little unsettles much and that war on the scale which we had to witness leaves no foundation stone unshaken. In revising the book then I found myself compelled to face very seriously the question whether the view of social development which it involves could any longer be maintained. I have not indeed been able in revising the book to deal with the specific issues of contemporary civilisation with the fullness which they deserve, for the point involved is only one out of many in an elaborate argument and requires a volume to itself for any adequate discussion. But I may be allowed to indicate here very briefly the reasons which have led me in substance to reassert my original view. The thesis involved in my general theory was that Humanity has for the first time become capable of self-direction. I was aware and was careful to state that not all the conditions of self-direction had been realised (otherwise it would be an accomplished fact, and there would be no question about it), but to be candid I had thought them so far advanced that it was well worth while to consider the theoretical position which would arise on their completion. Now among the conditions in progress of realisation was the liberation of repressed energies in masses of men, and in the years that have elapsed great strides have in fact been taken in such liberation. The optimist might have hoped that it would be achieved without violence, but that has not occurred. There has been violence in revolution and violence in reaction, anarchy and dictatorship; things have been done in the name of law and order which one had supposed to belong to a bygone age. Contemplating this violence alone one might suppose the very basis of civilisation to be sapped, but this would be a one-sided view. Order and liberty have not gone hand in hand, and so both have suffered. Yet if we consider the status of women, the position of the working classes in the industrial countries, the advance of Dominion government in the British Empire, the agrarian revolution that has swept Eastern

Europe, the new political consciousness and demand for elementary rights in India and China, the glimmering dawn even in the African mind, we must admit that in spite of dictatorships, ultra-Socialist or anti-Socialist, in spite of the extravagances of victorious nationalism, in spite of threats, from either side, of class war, a considerable work of emancipation has been accomplished.

We have not indeed reached the moral stature at which such things can be done without cost, and it must be freely admitted that a state of violence is a state of danger in which all that has been won may be lost. But let us face the worst and measure its possibilities. Suppose our civilised order to be broken up by intestine violence so that we are forced back on a ruder form of culture; still something would remain. The history of such reactions in the past, in particular the break-up of the Greco-Roman civilisation, shows that enough was saved from the wreck to serve as the basis of new efforts. As the ancient civilisation bequeathed the Christian religion, the debris of the classical culture and the idea of Roman law to its successors, so modern civilisation would bequeath ideals of humanity, liberty and the conquest of nature, and it may be that in starting afresh man would seek to preserve a better balance in developing them. In any case ideas are less mortal than the institutions that embody and serve to maintain them; something has been won which will not be lost, and if that something is short of the self-direction of our thesis, it does contain many essentials of such self-direction. These conditions then it is not unreasonable to retain as definite achievements of the modern mind, and though their fruition may be postponed they are sufficient (and this is the essential point of our theory) to define the direction in which the development of mind proceeds. That development may be arrested, but mind is resilient and if we know its goal we may with confidence infer that its march thitherward will one day be resumed. Hence, whatever our hopes or fears for the present fabric of civilisation, I have, after weighing the adverse evidence, come to the conclusion that the conception of human development as moving to a maturity of rational self-direction, at which the process would assume a quite new character, may be legitimately retained.

The scientific changes of recent years have been not less fundamental than the social and political changes. They do not, as far as the writer can judge, materially affect the main argument of this book, unless it is in the form of statement which, as the writer has often felt in going over the ground again, might be much improved by one better accustomed to the new formulae. In their general effect on the mental atmosphere they have however worked a profound change. The physical conceptions of the seventeenth century had by the close of the nineteenth century reached the culmination of success. In the fundamentals they had stood the test of time and their applications had widened to embrace the whole field of physical phenomena. They seemed to hold the world in an iron frame of mechanism. The fundamental laws were so simple and axiomatic, the calculations so rigid, the verifications so pat, that only the metaphysician or the mystic could dream of an escape. This rigidity has been broken. Axiomatic conceptions have been liquidated, the whole framework has been remodelled, and the new laws lack the appearance of self-evidence so convincing to the layman, which gave the older ones their weight. The effect has been to engender a certain scepticism of scientific method. Yet all the time physical science has been expanding its domain and adding to the power of man over nature. If regarded as a claimant to the whole territory of knowledge it seems to win every battle and lose the campaign. The reason is that as a calculus of relations between phenomena it constantly improves, but as an interpretation of reality it still suffers from the abstractness which is the very condition of its success. From time to time it pays the price of this abstractness in the form of discrepancies in its own field, and then it is compelled to reconsider them. So will it advance by degrees to a more concrete view. In the meantime the more philosophic physicists come to recognise that their's is after all only one way of formulating the nature of reality, that in the last resort their concepts are derived from and refer to the world of experience, that other forms of experience exist and that concepts drawn from the same source are equally entitled to respect, provided that they are mutually consistent. But, if the physical world can be thought of in terms of atomic structures, it is actually given in colours and sounds, and the reality of colours and sounds, and the beauty of their combinations is not done away with by any hypothesis about their causes, but is open to the same test of accordance or discordance in the deliverances of experience to which the atomic theory must submit. It is lack of accord in our aesthetic, religious and moral judgments which has weakened our belief in the ' reality ' of the orders which they contemplate. But their vitality is suggestive of some solid foundation, and if a satisfactorily coherent order has not yet been found it is no reason why it should not be sought. The aesthetic, the moral and the religious experience, we may add the whole experience of life and mind, rightly demand autonomy of investigation.[1] They have thrown off the authority of physics as physics threw off the authority of religion. They rest on the same basis, experience, and accept the same test, consistency. True all these autonomies must in the end live together. Self-determination can no more be absolute in the intellectual than in the political world, but the alternative to self-determination is not centralised despotism but the rational acceptance of necessary mutual limits. The problem of reason is to make a consistent system of all forms of experience, rejecting none except on the ground of proved incoherence. Such an ideal is a long way off; the way to it is to take every form of experience impartially and discover on what basis, if any, its deliverances can be reduced to a consistent order. When one form of experience appeared to have reached such an order with finality it very naturally obtained a dominating position and the rest were reduced to a servile status. The demonstration that this finality was illusory has emancipated the serfs. To drop metaphor, the rationalism of our day requires an all round treatment of experience no matter of what kind, by the common tests of consistency or inconsistency of results. It must reject the 'authority' of the physicist in regions of which, as physicist, he knows nothing, just as the physicist rejected the authority of the priest. It must accept any order which is reduced to coherence as provisionally true of reality and if it comes to a final clash between two such orders it will not assume *a priori* that one must prevail but will enquire, as it does within each department, whether it is not possible to find a synthesis which will eliminate the elements of inconsistency. Only when this is proved to be impossible is the rejection of an order of experience warranted. In the present work the plan is to range the diverse orders of experience under the two great categories of mechanism and purpose. The blind interactions of the partial energies of which reality is constituted are confronted with the common principle which makes of them a world and moves through order towards harmony. So considered both principles have their validity and it is in the light of their mutual implication that we are to interpret the infinitely diversified texture of concrete reality.

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[1] Compare Prof. A. N. Whitehead, *Science and the Modern World*, particularly Chapter V.

PART I

THE LINES OF DEVELOPMENT

CHAPTER I

THE NATURE AND SIGNIFICANCE OF MENTAL EVOLUTION

1. In the biological theory of evolution the development of mind takes a secondary place. The biologist is concerned with the laws of variation and heredity. As an evolutionist his main interest lies in showing that certain known facts of variation and certain established laws of heredity suffice to explain the development of the existing forms of flora and fauna in all their wealth from a single primitive type. A parent organism, an original living being he has for the present to assume. Recent physico-chemical research might indeed suggest that the evolutionary principle extends beyond the living world, that the specific forms or ' elements,' as we still call them, of ' inanimate matter ' may be conceived as developing in geologic time from a simpler, perhaps from a single primordial type, and that this type would be something (if the expression be allowed) not strictly material, but rather pre-material. But the gulf between the living and the inanimate remains for the present unspanned. The biologist has to assume the existence of living tissue, just as the physicist has to take the existence of negative and positive electrons as a datum which he does not seek to explain. Granted the existence of the living germ, however, the biologist can do much towards explaining the derivation from this single source of the vast complexity of forms which actually people the world. Not that in ' explaining ' he pretends to give the ultimate reason for all that he finds. Ultimate reasons are not precisely the

concern of a special science. He explains or seeks to explain in the sense that he traces the whole movement of organic life and the vast complexity of organic forms to the operation of a few clearly established empirical laws. The first of these laws is that all living beings in the normal course of their life history give rise once or oftener to other living beings by separating off a portion of their own tissue. The second is the equally familiar fact that the new living beings, either directly, as in the case of cell division, or after a number of cellular generations, as in the case of sexual reproduction, come to resemble their parent or parents in general type. The third fact is that this resemblance is not absolute, but is qualified by a certain degree of individual variation. The fourth is that under some conditions such variations are in turn perpetuated by heredity. The fifth is that of many individuals born only a certain proportion—among the lower organic types only a very small proportion—come to maturity and so reproduce their species in turn. To these may be added a sixth and last fact, that every living being is born into an environment in which it has to maintain itself against dangers and provide itself with the necessaries of life.

These are for the most part very simple statements of almost obvious fact. Yet in the hands of biological science these very simple considerations go far to explain the labyrinthine complexities of the actual development of life on the earth. It is true that when we come to close quarters certain of these statements raise questions of controversy which are by no means so simple. What, for example, are the nature and limits of that variation around the parental type which manifestly forms the point of departure for the entire process? Are all variations quite small and delicately graded so that there is always a continuity between any given type and any other that we recognise as related but distinct? For a generation after the publication of the *Origin of Species* it was the ambition of biologists to reduce all changes of form to variations of this kind, and so exhibit evolution as a continuous process. In later years, however, experiment seems clearly to have shown that, explain them as we may, wider variations also occur, and new varieties, if not new species, come into existence at a birth. The origin of these 'discontinuous' variations or 'mutations' which are now considered to play a dominant part in the history of organic evolution is still to seek. How does it come about that, arising in the germ cells, they take shape in structures which in some cases, in all that forward evolution, prove nicely adapted to the requirements of the developed individual? Is there a directive agency at work in the germ plasm? Or do experiences, or responses and efforts, of the parent foster tendencies in the germ plasm to structural changes suited to such experiences or favourable to such responses? Or are we to think that without such causal connection the inner changes of the germ plasm continually throw up new germinal structures, most of which, as they mature, prove unsuitable and perish, while some few prove advantageous and survive? The answer to these questions which the advance of research makes more rather than less urgent must affect our whole view of the underlying causes of evolution. But to a point, and we need not at present seek to go beyond this point, there is agreement. Mutations are still variations in individuals qualifying the general resemblance to the parent stock, though they are variations of a different order from that contemplated when individual variations were first conceived as the starting-point of new species. What is still more important, their perpetuation is subject to the conditions of the environment. If the mutation is such as to unfit its possessor to cope with the conditions of life he will not survive to maturity. He will not reproduce his type, and the mutation will disappear. If, on the other hand, the mutation is favourable, the stock once gifted with it will multiply and possess the earth.

The one condition which every successful variation must fulfil is that it should assist its possessors in maintaining their own existence, and in engendering and bringing up young ones after their kind. From this point of view the evolutionist expects to find in every new variation of structure which holds its own some closer adaptation to the requirements of the living species. But in the animal world, particularly as we ascend the scale, there comes into being one structure which in a sense dominates all the remainder. The central nervous system governs the whole body and therewith determines the use to which every part of it is put. But the growth of the nervous system and the entirety of its functions remains for the biological observer merely the most complex and finely adjusted of all adaptations. It is that structure which by the infinite delicacy of its adjustment to the minutest variation of stimulus enables the organism to accommodate itself to a myriad of changes in the outer world, and even to learn from the past and provide for the future. If an object approaches the eyes they blink and so protect themselves. If, nevertheless, a fragment lodges in the eye a tear rolls down from the lacrimal gland and helps to wash it out. These are very simple instances of reflex adaptation, and they are referred by the biological interpreter to a physical machinery which can in part be traced—viz. to a certain plexus of sensory cells, and nerve fibres, ganglion cells, motor nerve fibres and muscles which make up the regular constituent elements of a reflex act. This machinery is part of the hereditary endowment of the individual. It has come to be, according to the evolutionists' interpretation, because those who could not protect their eyes efficiently lost their sight, and left no descendants, because those who had the best eyes, which involved the best protecting mechanism, prevailed in the struggle. It is in short the product of a series of adaptations to the requirements of the living organism in its given environment. It is, moreover, interpretable as a purely physical process. The details of that process are still in large measure unknown. But there is no reason to doubt that the luminous waves proceeding from an object and impinging on the rods and cones of the retina produce in these cells some physical change. It is known that the change propagates a disturbance along the fibres of the optic nerve and that this disturbance proceeds at a measurable speed in the form of a wave and is accompanied by certain electrical phenomena. The result of this disturbance, to omit the intervening stages, is to set up certain chemical changes in the muscle-cells which move the eyelids, causing them to thicken and shorten and thereby to draw down the lids. In the case of the tears the disturbance is communicated to the cells of a gland which it causes, instead of contracting, to secrete their peculiar product.

2. In all this there nowhere appears any reason to impute the existence of any forces but those that we call mechanical or chemical. It is true that the details of the mechanism or of the chemical change are not yet fully made out. But so far as investigation has gone it has yielded no reason for excepting reflex-phenomena from ordinary mechanical laws. The reaction is no doubt complex, but it is pretty nearly as regular and undeviating as the response of any confessed machine to the pressure of a knob or the turning of a handle. The child squeezes its doll and in virtue of a cunningly concealed mechanism it cries. Something squeezes the child and in virtue of a still more cunning mechanism it cries more effectually. There is the mechanical view. And at least in the case of blinking it has this to support it—that the response as a rule is given unconsciously and intelligence neither makes nor meddles with it. The act serves a purpose—yet it is not purposive. It is the result of a preordained structure, of a structure which has come into existence to do that particular thing quite as much as a bit of machinery has been made to play its particular part whatever it be. It is a case of a function executed by the organism and serving the ends of the organism, which depends nevertheless on purely physical laws and in which conscious purpose has no part to play.

The higher and more complex acts of animals and of man differ, it would be admitted, in important respects from responses of this type. They are not unattended by consciousness. To many of them the presence of consciousness appears generally essential. Nor are they uniform and undeviating in their course. On the contrary they are varied from occasion to occasion and even from moment to moment, and varied, it would seem, in accordance with an intelligent appreciation of the needs of the situation. None the less, such examples as those quoted, and the extreme difficulty of definitely formulating any alternative view have suggested an interpretation which would reduce all conscious and therewith all psychical activity to the level of a vastly complicated and glorified mechanism. The series of mechanical changes it is conceived must be unbroken. As the speck of dust sets up a train of molecular movements which ultimately issues in the secretion of a tear, so the stimulus of printed words affecting the optic nerve spreads its wave of influence over the brain and, no doubt through combinations of infinite complexity with other influences, produces by a strictly physical process some final modification in the reader's conduct of life. All that the man so affected is aware of is a series of changes in his own mind—new thoughts, emotional suggestions, the interaction of new and old experiences, the crystallisation ultimately of half-formed suggestions into a new and definite rule of conduct. To him the suggestions appear as the antecedent conditions and his own resolutions as the complete and sufficient cause of the line of conduct that he adopts. But if he propounds this theory to a convinced exponent of mechanical uniformity he is met by some exceedingly difficult questions. The process in question begins with something physical, that is to say with masses in motion, and it ends with something physical; a physical basis, the brain and nervous system, is a necessary condition of its continuance and successful termination. Are we then to understand that there is at some point a break in the physical process? If so, we shall have to say where precisely the break occurs, and this without making arbitrary assumptions we shall have great difficulty in doing. Not only so, but what is more serious, we shall have to assume that at the point where the break occurs a uniform mechanical process by which one mass movement gives rise to another in accordance with uniform law comes suddenly to a dead stop. There is some particular movement of some particular particles which sets up no further movement, but instead of so doing has as its effect a modification of a totally different kind of thing called Consciousness. This thing being set to work arrives in its turn at a point where it, not being itself a mass in motion, nevertheless sets a molecular mass in motion, and so presently brings about what we recognise as an act of the individual.

3. This account involves so violent a discontinuity in the causal process that most thinkers shrink from it, and take refuge in some theory of Parallelism. According to this view there is no breach of physical or mechanical continuity. If we could master the whole details of the neural process we should find that in the most complex deliberation, as in the simplest reflex, they run their course in the fixed groove of mechanical law. Motion gives rise to motion within the brain cells and along the brain fibres in strict accordance with the general laws of Mechanics. But certain motions of certain kinds of molecule are for reasons unknown to us accompanied by definite changes in that which we know as consciousness, the relation being so intricately adjusted that there is a point to point correspondence between molecular and conscious modifications. The two streams flow, so to say, not merely side by side, but in one bed. Each, considered internally, exhibits perfect uniformity of sequence, and together they form the whole which is the internal life and external behaviour of the conscious thinking animal.

This theory in turn has many points of difficulty. But what concerns us principally here is to note one of its main consequences. The phenomena of consciousness, metaphysical theories apart, are limited to animal bodies, and moreover to certain processes only which occur within animal bodies. The physical, on the other hand, is everywhere. Thus the process to which a physical stimulus first gives rise and which ultimately issues in a physical action is physical throughout. On the mechanical plane its continuity is unbroken, and its self-determination is supposed to be complete. Upon this process the mental or conscious series is at a certain point superimposed, and at another point taken off again. It is as it were a temporary, and so far as the effect of the process is concerned, an accidental and superfluous addition. It is clear from the supposition that the mechanical order must determine itself, and the conscious order take a secondary place. Consciousness in fact becomes what some writers have called it, an Epiphenomenon. So far as the course of events in the universe is concerned, consciousness, feeling, intelligence, forethought, resolution might as well not be. The secret of organic life is the intricate adaptation of physical structure to respond in such manner as the life requirements of the species dictate to the circumstances of the physical environment.

I shall not for the moment attempt to resolve the difficulties briefly set out. Whether a solution securing a more real position to the conscious factor is ultimately possible will be found to turn in the end on the question whether every event or phase of process must be supposed to proceed uniformly from a pre-existing phase or whether it may be conceived (as we seem to conceive our own efforts) as really determined by relation to that which it itself brings about. With this question we shall deal at length in its turn, and from the discussion some light may I hope be obtained. We may note for the present that the psycho-physical view which reduces the whole mind-life to the rank of an epiphenomenon is merely the most extreme and consistent expression of a result to which the biological treatment of mental evolution tends. 'Mind' is here in all essentials evolved structure. Biologists may be careful to eschew metaphysics and may avoid the charge of materialism by a judicious selection of phrases. None the less it lies in the nature of the biological treatment to think of mental activity like all activity, like muscular contraction or glandular secretion, like respiration or digestion, as the function of a structure. That structure is the cerebro-spinal nervous system, and the functions which that system performs may be summed up in one formula. They are such as to accommodate the actions of the organism to the conditions of the environment. They are in man on a very large and complex scale what the respiratory or muscular mechanism is on a smaller scale. As these are arranged to secure a permanent supply of oxygen, the maintenance of an even bodily temperature and so forth, so the nervous system is arranged to secure such action as will, by however circuitous a route, feed, clothe and preserve the organism, cause it to produce children and rear them. The machinery gets more complex, but it is still machinery arranged to secure the ultimate object of the survival of the species. Mind and the world of mind, society, government, the churches, religion, law, are products which have grown up under the pressure of the constant and supreme biological need, and exist only to serve that need. They are evolved to meet the requirements as an aquatic species on taking to the land is held to have evolved lungs, and if their vital function ceases they atrophy as the eyes of a cave-dwelling animal atrophy. Their end and object, their causation, is not in themselves but in the more fundamental biological conditions from which they are thrown up. It must be added that these conditions seem at a vital point to be positively hostile to certain of the effects of mind-development. For it is a general condition of the good adaptation of a species to an environment that the weaker members of the species should be persistently weeded out. But with the expansion of mental life come affections and sympathies, and later on religious and ethical sentiments inculcating mutual aid, discouraging the struggle of each for himself and enjoining the preservation of many who but for such assistance would go under in the life-storm. The rise of such sentiments is from the strictly selectionist point of view a case of the emergence of a functionally noxious variation which must be stamped out if the human species is to survive, and the strict spirit of biology has in consequence waged war for a couple of generations on such schemes of social and political amelioration as tend to peace and equity between nations, co-operation between classes, and mercy and tenderness for the weaker brethren. It is however only fair to say that the resulting contradiction between the teaching of biology and that of civilisation has at length had its effect and the trend of biological opinion now is to interest itself in the artificial selection of types for reproduction as a civilised substitute for the elimination by natural forces of those who cannot stand on their own feet. With the value of this view, which represents the effects of sociological criticism impinging on a more ruthless doctrine, we are not for the moment concerned. What is of interest is the entire subjugation of the life of mind to biological conditions. It is the survival value of certain types of nerve structure which has given birth to the world of mind, and which remains the condition of further development within that world. Mental vigour, moral worth, as properly estimated, are means by which a type can maintain and improve itself. Whatsoever soul is hard, whatsoever is unlovely, what there is of self-assertion, if there is any ruthlessness, if there is any unimaginative self-centred push, this type shall prevail, for of such is the process of evolution.

4. If this were indeed so, some might think it better that the process of evolution should cease. But it is worth enquiring afresh whether the account given by biology of the part played by mind in organic evolution is an adequate account. For this purpose it will be necessary to take a summary view of the actual phenomena of mental development so far as they can be ascertained both in animals and in man. This is attempted in the first part of this volume, and it will conduce to clearness if the broad results are briefly stated by way of anticipation.

Our review then will go to show that, without involving any discontinuity either as between the lowest living organism and the intelligent animal, or as between the intelligent animal and man, without, that is to say, involving any change so sudden and great that we cannot conceive it as bridged over by the cumulative effect of relatively small variations such as are known to occur normally in the life of species, the resultant changes disinterestedly stated are such as would properly be called changes of kind, and of a kind very material to the future possibilities of man. That cumulative changes of such a kind as are now known to be compatible with the working of heredity may sum themselves up into a distinct change of quality need occasion no surprise. We all know that in the individual bony and muscular tissue alike arise out of an original undifferentiated mass of protoplasm. Yet bone is one thing and muscle another and the protoplasm of a fertilised ovum a third, and if these things are not qualitatively different, the term quality has no meaning. In the same way we shall see grounds for thinking that the reason of man differs in kind from the intelligence of the dog, and the intelligence of the dog differs in kind from the blind gropings of a polyp without proceeding to infer that no course of development could ever have produced the one type from the other. The truth is that it is only when we admit and emphasise qualitative distinctions that we arrive at the full sense of what development means and what it can do. It is the natural tendency of an evolutionary theory in its first phase when struggling for existence to pare away and depreciate the distinctive features of the most highly developed and peculiar structures which it has to explain, to bring them as nearly as it can to the level from which development is to start. This is the natural protective device of an infant theory threatened by enemies in the shape of prejudice and incredulity. The time has gone by when evolutionary theories stood in need of such adventitious and indeed slippery and uncertain aids. We can surely afford now to look the facts steadily in the face and faithfully report the actual scope of mind-development as we find it.

From this study then there emerges as the principal result the recognition of certain qualitative changes which vitally affect our interpretation of the process of human evolution, its genesis, its potentialities and its permanent conditions. The sum and substance of these changes is to effect a complete revolution in the position of mind as it exists in living beings. Coming into existence as the biologist has told us as a means of securing the permanence of the species it never loses that function, and indeed comes to perform it more efficiently. But it ceases to be limited by the conditions of its genesis. It becomes self-determining, is guided, that is to say, by values which belong to its own world, and finally it begins to master the very conditions which first engendered it. In the end, when we have fairly taken the measure and grasped the conditions of its growth, we are led to regard the development of mind not as a side product of natural selection but as the central fact of the history of life upon the earth.

5. The development which we have to trace falls into two main divisions. In examining the emergence of intelligence as a factor in the life of the lower organisms, in measuring its growing importance in the behaviour of the higher mammals, and in estimating the qualitative changes which mark the transition from animal to human mentality, we are dealing in the main with the functions or capabilities of the individual mind. But as soon as we begin to follow the track of the higher developments of mind in man the nature of the enquiry changes. The forces to be considered are now social rather than psychological, or, more accurately, are matter of social rather than individual psychology. We have to do not with the emergence of any new faculty, not with any essential change in the structure of the brain or in the sum of hereditary dispositions or capacities, but rather with the social product to which the individual mind contributes its mite, which is gradually built up by millions of individual workmen in the course of ages and which undergoes profound modifications within the limits of recorded history. This branch of our enquiry, that is to say, is concerned with what is sometimes called the social mind, by which is meant the Order formed by the operation of mind on mind, incorporated in a social tradition handed on by language and by social institutions of many kinds, and shaping the ideas and the practice of each new generation that grows up under its shadow. The enquiry into the growth of this tradition is rather sociological than psychological. It is an enquiry into institutions, into creeds, into social relations, rather than an enquiry into the consciousness of individual human beings. The opposition must not be exaggerated. There are social forces at work in the psychology of the higher animals which live, some in herds or swarms or flocks, some in families of greater or less permanence. There are also individual and racial differences among men which affect their capacity for supporting or advancing the social tradition,

and the question whether actual human faculty—the average equipment with which the individual is furnished by physical heredity—improves with civilisation is an important question. But it is not the main question with which we have to deal in tracing the growth of the social mind. With no change at all in the average hereditary individual capacity in a group, the very greatest changes might be brought about in the course of a few generations by social forces; and the probability is that the greater changes of history, including both the rise and the fall of nations and of civilisations, are attributable to such social causes and not to sudden variations in the average hereditary qualities of races.

Be this as it may, it is to be understood from the outset that the scope of our enquiry includes the social along with the individual. Could it ever be fully carried out it would begin with the most rudimentary germs of mental activity discoverable in the lowest organisms: it would trace the successive stages of mental growth in the higher orders of the animal creation till it reached the beginnings of human intelligence; and thence proceeding essentially by the same method, but concerning itself now for the most part with social forces and social products, it would follow the successive stages in the movement of human thought from its first beginnings to that phase of development in which we live and in which we share. The data for such an enquiry are not and perhaps never will be complete. Our conception of the lower phases of mind is necessarily inferential, and the path of inference here is surrounded by many pitfalls. Our knowledge of the earlier societies is scanty and at some important points altogether wanting. But in all this we suffer no more than biology suffers from the imperfection of the geological record, and though we may never be able to paint an accurate picture of mental evolution as a whole, there is no reason why we should not endeavour to seize on such salient points as may serve to determine its trend and measure the length and direction of the path along which it has moved.

6. Up to this point, as has been remarked in the Introduction, our method is purely empirical. We have simply

to analyse and compare the operations and achievements of mind in successive phases, to show how one phase may be conceived as issuing from another, and to indicate the nature of the changes successively introduced. But particularly as we reach the higher phases we shall see that another set of questions underlies our whole enquiry. When for example we deal with the emergence of rational method, as in science and philosophy, we shall have to take account of the claim of such a method to yield truth. This claim is an integral part of this particular phase of development, and we shall not be able to understand that phase or place it in due relation to others without enquiring into the nature of rational method and thus opening up the question of the validity of thought. Similarly on the ethical side we shall come upon theories of conduct or of human well-being which we shall not be able to interpret without opening questions as to the meaning of such terms as good and bad, right or wrong. It is true that we might keep to a purely historical method by merely recounting the opinions which men have held or the methods which they have in fact pursued. But it is clear that our conception of a given intellectual movement will differ radically according as we hold that it is a movement towards truth or towards error, or again towards a goal of real value or to one of no greater account than any other. Thus if our object be not merely to record the successive phases in the movement of mind but to appreciate the direction and magnitude of that movement—and this is the object which I would propose for the enquiry—it is clear that we have to go outside the purely historical method of treatment; we must apply a philosophical theory of the basis of rational belief and action in order that we may take stock of the position at which we have arrived. If, for example, we can satisfy ourselves that we have some knowledge of reality, grounded, let us say, on the methods of science, then we shall be able to treat the historic development of science as a movement towards the knowledge of reality. If, on the other hand, we take the view that scientific method suffers from incurable defects or limitations which preclude it from ever supplying a genuine interpretation of the reality of things, then clearly we shall put quite a different valuation upon its growth, and our whole estimate of modern civilisation will be vitally changed. Thus from the study of historical facts we are led on to a study of values, of the ultimate grounds of belief, the meaning of rationality, the possible scope of knowledge, the considerations which reasonably determine action. We have not only to distinguish successive phases of development, but we have to estimate the direction of development as a whole, and for this purpose we must make use of valuations which open up all the ultimate questions of meaning and validity. It will moreover appear, I hope, in the sequel, that the conception of development in its turn throws no small light on these ultimate questions. The advantage to the two branches of the enquiry is mutual, and if we could arrive at no satisfactory conception of the trend of development without a theory of the rational and the good, it will be found equally that our conceptions, and equally our misconceptions, of the rational and the good are intimately connected with the idea of development.

To put the matter very simply, the object of our historical enquiry is to measure the growth of mind from the lowest to the highest phase of development. But how are we to know which is the highest? The term itself implies a valuation, and unless we have a reasoned standard of value we have no scientific means of determining the *terminus ad quem* of our narrative. We certainly cannot take our own civilisation as the highest product of the social mind without any dubiety or any reasons given. It does not, to say the least, stand so high in its achievement above some earlier civilisations which arose and flourished and passed away. Human development, it is well to recognise from the outset, does not proceed continuously in a straight line. If we make the civilisation of our own day the terminal point of our narrative we have still to ask whether this point is the 'highest' yet reached or whether it marks a decline from some earlier stage, and this is a question which can only be determined by the aid of a standard upon which the 'higher' and the 'lower' are clearly marked. If in the end we come to the conclusion

—as for reasons which will be given, I believe we may—that our own civilisation does upon the whole represent a certain net advance on the previous efforts of humanity, this conclusion must be based upon a clear-sighted comparison of the historical facts with an agreed standard of values.

7. Lastly, the most interesting class of questions concerning development cannot be answered by history alone. A just conception of the trend of development is most valuable to us in as far as it concerns the future. But though history may suffice to show us the orbit upon which the evolution of mind has moved we cannot project the curve into the future by the aid of history alone. We shall have to investigate the permanent conditions of mental growth, and when this problem is taken in its broadest aspects it will be found to compel an examination of the whole position of Mind in the system of Reality. This investigation must decide first whether Mind is, as suggested by the mechanical theory, a mere 'epiphenomenon' or a substantive factor in evolution, and secondly, if it is a factor at all, what position it holds and what function it performs. This will necessitate an analysis of the causal process, which will again involve an appeal to first principles. This analysis will occupy the second part of the volume, and the attempt will there be made to show that by its means we arrive at a conception of Mind and its function in Reality which is in close harmony with our historical results and which accordingly serves to corroborate and extend the interpretation which they suggest.

The scope and method of the book then may now be briefly defined. Its object is to determine the nature of Mind and its position or function in the system of Reality and its method is first to trace the historical development of Mind from its earliest ascertainable conditions to its latest phases, secondly to value the achievement of these phases by a philosophical analysis, and thirdly, to apply the results of analysis to the elucidation of the efficacy and scope of Mind as a cause. It will be argued finally that the historical review and the philosophical analysis converge upon the same result, in the sense that the process of evolution when viewed in its completeness serves as a concrete verification of the general theory of Mind which analysis suggests, while conversely the theory serves to interpret and explain the course of evolution. If this is so, we shall have some ground for the belief that our metaphysical conception of Mind is not a piece of abstract reasoning that stands in no contact with living fact, but serves as the explanation of a vast historic movement. At the same time we shall have reason to think that this movement which we trace through the whole sweep of terrestrial evolution is no secondary and isolated result of a unique collection of circumstances, but is of the essence of the world process. Our empirical account will in fact yield us a picture of Mind neither as the Lord of all, nor as the casual bye-product of the clash of forces, but as an impulse towards organic harmony working under limiting conditions which it gradually subdues, and in such an impulse on a still vaster scale we shall find in the end the most reasonable interpretation of the vital process of the cosmic order.

CHAPTER II

THE STRUCTURE OF MIND

(1) *Consciousness and its content.*

What we know of mind together with what we know of the world in general is derived in the last resort from the sum of that which comes before our consciousness. We experience, we think, we desire, we purpose. In all these cases we are or may be conscious, and in all there is in ordinary phrase some object with which we are concerned. The phrase is not free from difficulties. It carries associations which are ambiguous and even contradictory. Thus on the one hand it appears as a relative term, implying a subject on which it depends. If there is an object of sight, of hearing, of thought, or purpose, there must, it may be said, be a subject which sees, hears, thinks or purposes it. On the other hand, by a contrary turn of association, the object, it may be held, is just that which is independent of any subjective element and in using it we may seem to be assuming a theory of external reality. But as here employed the term is to convey neither meaning. The object is something which we see, hear, think of or purpose, but by calling it an object we do not imply that its existence depends on one of these acts. Nor again do we imply the contrary. All that we do maintain is that the act of consciousness has an object. We feel, see, think or purpose something. The former terms are grouped together as acts or modes of consciousness. The 'something' is the object of consciousness. The statement however implies that we can know that we think, feel, etc., which is as much as to say that the mode of consciousness, the act of entertaining or contemplating an object may itself become the object of a conscious act. It is from this secondary or reflective consciousness, or if the phrase be preferred, it is from these elements in the objects of consciousness that the beginnings of our conception of mind, self, personality, appear on a first view to be derived.

This view however may be challenged from more sides than one. In the first place, it may be argued on etymological grounds that the term consciousness is inappropriate as an expression for any direct operation of knowing, feeling or willing. To see or hear is one thing, it may be said. To be conscious that I hear or see is another. It is something that implies two co-ordinate or concomitant operations, seeing and being aware of seeing, and it is just this doubleness that the form of the word conscious conveys. To this it may be sufficient to say in reply that the use of a term is to be settled by convenience rather than by etymology. It is indeed necessary to distinguish the grades of complexity in different contents, and it is true that there is a valid distinction between seeing and knowing that we see. But underlying this specific distinction there is a more fundamental and generic identity. There is in the simple as in the more complex case something that is aware, something that has an object before it in one way or another. We need a name for this something and the name consciousness serves our turn. Consciousness is that which has before it, has present to it, is aware of some object or other. The term serves as a grammatical subject in any one of those sentences. Neither the subject, nor the verb, nor the predicate appear to be capable of further definition in the sense of resolution into simpler or more general elements. They are on the contrary general conceptions to be defined (*a*) by enumerating the specific types which fall within them, and (*b*) by distinction from allied conceptions with which they may be confused.

But here a more serious criticism emerges. We have treated ‘ consciousness ’ as a subject in a sentence, and this is as much as to imply that there is a distinction and also a relation between consciousness and its object. We have come to know this relation, our preliminary account suggests, by a more reflective act of consciousness. What is subject at one moment is object at another. I see Halley's comet, and so far the comet is my object. But I also report the seeing, and here the conscious state *qua* conscious has itself become the object of my thought. But in attending to the process of seeing, must I not lose hold of the object seen? And yet if I do so, is not the process of seeing at once vitiated—destroyed therefore in the act of apprehending it? In principle this must be denied. I do not cease to see the comet when I know that I see it. I do not lose hold of A when I note its relation to B. It is, however, true that when I pass from attention to A as such to attention to A in relation to B, there is a more complex object before me, in which A is only a part, instead of being, as before, the whole. So when I attend to the process of perception, the percept no longer occupies me exclusively, since, as will appear immediately, the area of perfectly clear discrimination is limited. This fact does introduce a real difficulty in introspective psychology, greatly restricts its value, and has even led some to deny the validity of introspective methods altogether. It is not, however, necessary for our purposes to use introspection in cases which present substantial difficulty. Our direct consciousness of mental process is sufficiently clear to found a general conception of conscious life and activity, to enable us to recognise the leading species of this activity, and to infer its operation from results in cases where it is not directly given. This will be all that our account will be found to assume.

There is, however, a further and a double question. Has the term object a constant meaning in our account, and is it in fact always clearly distinguishable from the subject? Take the latter half of the question first. Feeling is one of our acts of consciousness. Is there in pure feeling a distinction of subject and object? Feeling no doubt has in general its physical cause, *e.g.* pressure on the exposed nerve of a tooth; but the cause is not a constituent part of the feeling itself. Is the feeling distinguishable as an object from the subjective awareness of it? Suppose that by the mere effort of shifting the attention it is overcome, as within limits is certainly possible; is not its purely subjective character made manifest? It might be answered that in the case where it cannot be so overcome, its objective character is made manifest. But in fact on either argument we are really dealing not with the constitution but with the causation of the feeling, and are speaking as though an object must be independent of the subject, which has not been assumed. The feeling may be nothing but a modification of which *I* am aware. Even so, it is not the me itself, it is within the me, and the awareness is the relation of the whole to the part, the continuant to the passing. But in feeling there is more than mere awareness. There is a reaction varying from welcome and acquiescence to every degree of repulsion. At the mean between them the intensity of reaction sinks towards mere awareness as the zero point. Ambiguity arises because the name of feeling may be given to the element in consciousness on which the reaction is founded, which is of course not itself the total act of consciousness. In that total act there is an object present to consciousness and a reaction upon it. If the object only exists within the me it is not the me itself, but an element within it. Suppose the element swells to the point at which it overwhelms me so that I am merged, lost in it, as in intense agony, do we not just at that stage lose true consciousness? As long as I react upon it, I have awareness. As the distinction of subject and object is blurred so also is awareness, and at the limit they come together.

To turn to the other side of the objection; in conation, desire, wish, it may be said that the object is very different from the object of cognition. It is an aim which does not exist while the conation is in progress. It is, one might say, its non-existence rather than its existence which is the very basis of the conation. We shall have to return to this point in another connection. Here it might be sufficient to say that consciousness has an object before it in one or other of the senses of that term, but we may go a little further in indicating the common element in those two senses. In conation consciousness is directed to something other than itself. The directed activity is the subjective, the end defining direction the objective, term of relation. If it be objected that the conation may fail and the aim never come into being, the reply is that the activity is still directed by something other than itself (the existent situation) in the development of which, if the conation is successful, the end comes into being. The object as end is, in fine, a modification of an objective in being (the situation dealt with) and with this conation stands related all the way through.

(2) *Mind and Consciousness.*

If this analysis is justified there is no initial difficulty in conceiving the 'operations' of consciousness or its varying relations to its object as the elements out of which our conceptions of Mind and Self are empirically constructed. It is with the former conception that we are especially concerned and we have to examine its logical foundation. Consciousness, as appears from our previous account, is the name for a state, an act or a condition, in short for something temporary. We seek for something more permanent to which we can refer it, for the same reasons which make us impute colour, sound, length or weight to material substances. Into these reasons we need not enter here. It will suffice us for the moment that we give the name of Mind to the permanent unity of which we conceive any given act of consciousness to be the temporary condition, act or state. But it may be asked why, granting the desirability of something permanent as the vehicle of consciousness, should we look beyond the body, a permanent object which we are already forced to construct by the evidence of a mass of common experience. Is Mind another entity; is it a substance like the body, and if so how are the two related?

If we are to deal, however summarily, with these questions, we must first review the body of experience which underlies the conception of Mind as a distinctive unity. This experience, to state the facts very generally, yields two data. The first is that the subjective factor, which we have insisted on as an element in consciousness, is for each one of us a permanent element. It is always there when consciousness is there. It is the same 'I' that feels hungry, or cold, reads a book, climbs a hill. It is the same 'I' which memory gives me in the remote past and anticipation projects into the future. What does 'the same' mean here? Not certainly that I am unchanged, but that I can view my conscious life as a whole in which there is a certain thread continuing throughout, and retaining amid change a certain element of persistent character. This continuity in consciousness is not indeed the whole, but it is the core of the 'I.' But consciousness itself is broken, *e.g.* by sleep, and the sense of an unbroken continuity which unites me to my past would be illusory if my existence depended on consciousness alone. This brings us at once to our second datum. This is that the facts of consciousness reveal upon examination the working of causes strictly continuous with those that appear within the field of consciousness itself, but yet extending outside that field. There appears in short to be something that operates unconsciously, but yet in a manner closely comparable and even in essence identical with many of the operations familiar to us as operations of consciousness. Moreover by these operations, proceeding as it were in the background, the attitude of consciousness is in a large measure determined. Conscious and unconscious operations then may be legitimately grouped together, and without prejudgment as to their ultimate nature the sum of them may be called Mind. Mind then appears as that which has consciousness in its foreground while in the background it is the theatre of energies, of interactions, of stresses and strains, the play of which goes to determine the character of the scene by which the said foreground is filled. To understand this relation, not in its metaphysical essence, but in its empirical detail, is highly important for our purpose.

We may approach the question by a simple and familiar analysis of the ordinary content of every-day consciousness. As I write these words my interest is concentrated directly upon the idea that I am seeking to express. This forms the 'Blickpunkt,' the 'centre of vision' in the field of my consciousness over a considerable space of time. From this centre many other elements are from moment to moment determined. The central idea expresses itself in words, of which the most important are matter of conscious choice occupying therefore for the moment the centre of attention. The lesser words, the 'ifs' and 'ands,' come more automatically under the influence of the meaning which the sentence has to express, and the actual writing is of course in the main a more or less mechanical process. This part of the proceeding however is psychologically not the least interesting. Consciousness, though barely occupied with it, retains control over it, sufficient, for example, as a rule to notice and correct a slip, though in fact success in this respect will be in inverse proportion to concentration on the main idea. The detail of the writing then is half within and half without the control of consciousness. It occupies a marginal position. Yet beyond it there are still further and dimmer sense-elements; the objects on the table coming within the sphere of vision, the sense of sunlight and chirrup of birds out of doors, the permanent background of organic feeling. Lastly, the thinking process may be vaguely disturbed by a sound which presently reveals itself, as the striking of a clock, and in this case there may be the paradoxical effect that the strokes which I definitely hear are the last two or three, but that when I notice them I am at the same time aware that there have been several previous strokes. I am in fact aware of *having heard* these strokes though I was not at the moment aware of hearing them.

So far this brief and familiar analysis shows that in consciousness there is every gradation in the fulness and distinctness of presentation from the maximum of clearness to a zero, and also to something below this zero. The field of consciousness appears not like a material object with clear-cut outlines, but more like the halo of light which a lamp projects into the darkness. There is a gradation from the focus of the rays to their extreme verge, and the outline of light is not clearly marked. Light fades away into darkness. But that is not all, and when we pursue the matter further the image of the lamp requires modification. For not only is there an oscillation between the light and the dark which we might compare to the effect of a swinging of the lamp, but what goes on in the dark area affects the lighted area just as if it had passed there. I do not refer merely to the marginal sensations like the striking of the clock. I refer to the causes operating normally on the definite elements of content within the field of perfectly clear consciousness. Thus in my example I spoke of the words suggested by the central idea. How does the idea come to suggest these words? For the most part not through any conscious process of which I could render account, but by the reaction of the present purpose on my antecedent knowledge of my mother tongue. A host of experiences relative to the use and meaning of words, experiences long forgotten and perished beyond recall in their individual character are the influences which have furnished me with whatever expressions I have at command. But observe that this process of suggestion may itself at any moment become conscious. Thus when in the previous paragraph I wrote the word ‘ Blickpunkt ’ a conscious recollection of a well-known passage in Wundt's *Physiological Psychology* operated in my mind, and there even arose in it faint images of the room in which twenty years ago I first read that work. It might quite easily have happened that I retained the word and forgot Wundt, but the fundamentals of the process would have been just the same. Similarly if a question occurs as to the suitability of any word, the processes which suggest it, the relations of meaning, the grammatical or etymological connections are called up into consciousness. They are, as we always say, rendered explicit. They are ‘ there ’ already by implication, and need only a movement, a re-direction of attention to be brought forward as distinct objects. In this respect their position closely resembles that of the sounds of the clock which I am aware of as soon as something calls my attention to them, but which otherwise may pass unnoticed. They are ‘ there,’ but not known to be there. That is to say, they are in the mind though not in consciousness, and that again, to keep to facts which we can verify, means that they belong to a mass of operative elements continuous with consciousness, capable of figuring in consciousness, influencing the contents of consciousness, but not necessarily at any given time distinct elements in the content of consciousness. To use once more the figure of the lamp, consciousness is at any moment the area indefinite in its boundaries on which the light falls. Mind is the whole area which the lamp, as it turns this way and that, is capable of illuminating.

We may profitably carry the figure a little further. Let us suppose that in the sphere around the lamp many things are going on which intimately affect one another. It is a field of interacting forces, which are only to be thoroughly understood when understood as a whole. Let us suppose that the lamp is swinging in all directions so as to illuminate the whole area in turn. An observer would then have the entire data before him for understanding the processes in question. He would obtain them piecemeal, but he would be able to put his results together, and there would be no source of information from which he would be entirely cut off. Suppose, on the other hand, that the lamp was so pivoted that it would only swing in one plane, or perhaps that it was even limited to a section of that plane. The observer would then be in a very different case. He could only obtain a fragmentary knowledge. If anything were so arranged as to occur regularly in that plane he could forecast its behaviour, but without adequate knowledge of the underlying forces. Suppose, finally, that after being limited to a segment, the lamp were set free to sweep the whole circumference, and after being limited to a plane were set free to sweep the whole sphere. The spectator would then be aware of a complete change in the point of view, carrying him below the surface to the real causes of the events transacted before his eyes. It is by a change involving a re-orientation of this kind that the mind that has been limited to the surface of experience comes to apprehend the deeper causes of things. These causes may be external, or they may be forces operating within the depth of the mind itself. In either case they require an enlargement of horizon and change of direction in order to be brought within the direct purview of consciousness.

The matter of re-orientation, with the consequent bringing of the unconscious into consciousness, is one of which we shall have a good deal more to say at a later stage. But let us here put together the two main data which experience yields for our conception of Mind. We have first the presence of the subject in consciousness. The only positive objection to conceiving the subject as the permanent unity which we require for the changing states of consciousness was that its permanence is broken along with that of consciousness itself. This objection is removed by our second datum, which yields the conception of a continuance of partly conscious or quite unconscious process surrounding and determining consciousness. This continuant has for its distinctive character that it may at any time under appropriate stimulus enter into a state of conscious activity. So conceiving it we call it Mind.[1]

(3) *Mind and Body.*

But, it may be said, all those unconscious influences that surround consciousness, which constitute what we have called our 'second datum,' are so many witnesses to the sole sufficiency of Body as the true subject, the permanent unity of which consciousness is a state. The brain is a physical structure interacting with other physical objects. One of its peculiarities is that when it acts in a particular way, when, for example, certain of its areas are traversed by waves of excitement, there arise the phenomena of feelings, ideas, and all that we know as consciousness and its content. Other brain reactions are in their main physical characteristics similar to these, but are not accompanied by consciousness. It is perfectly intelligible that they should affect those special processes with which consciousness is concerned, for all parts of the brain stand in intimate physiological relation to one another, and thus it happens that the basis of much that goes on in consciousness is to be found in molecular interactions not accompanied by consciousness. Mind is really brain and nothing more. No other permanent subject is either directly experienced or implied by experience.

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[1] I have left the above passage as originally printed though aware that it may read oddly to a generation so well acquainted with everything that is known about the unconscious mind, and perhaps with more than there is to know. On the whole, it seems as well to recall that the conditions under which we can assert anything of the nature of mind without consciousness require very careful limitation. To take only one illustration : it follows from the argument in the text that the unconscious ideas, wishes, resolves, etc., now so familiar to the popular psychologist, have no existence. Ideas, wishes, resolves are conscious states. They may be the effect or the cause of dispositions, tendencies, strains, etc., within the mind of which we are not conscious, but if they were themselves in the unconscious, the unconscious would be, *per impossibile*, another consciousness, and as such it seems in fact to be treated by some writers. This multiplication of consciousness may exist in pathological cases of a certain type, but it is quite unscientific to employ it, still more to employ loose phrases which, if taken seriously, imply it in the ordinary phenomena so attractive to popular psychology.

Now the body is no doubt a continuous unity with whose functions conscious activity stands in close relation. But it is not a 'permanent subject,' because it is not strictly a 'subject' at all. To identify mind and body in the sense of resolving one into the other is simply to confuse distinct categories. Body, as known to us, is that which is measurable and ponderable, that which has mass, which moves and is moved, is visible, tangible and so forth. Mind is that which feels, sees, hears, judges, expects, infers. To say that mind is body is as much a confusion as to say that a weight is an inference or that an acceleration is a wish. Very slight consideration shows that if mind and body are to be identified in any intelligible sense the meaning must be that in any individual they form one permanent reality whose attributes include on the one side the phenomena which we group as physical, on the other those which we group as mental. Such a reality would be a psycho-physical whole, which we may call the Self. This conception may pass as a *prima facie* account, and it serves to put the question of substance in the right form. For at bottom what we have to ask is whether the mental phenomena depend on the bodily, or the bodily on the mental, or whether there is some interaction between the two. That is to say, to understand the relation of mind and body we ought to know whether the totality of the processes going on within the self is to be understood in mechanical terms as a series of actions and reactions of masses in motion, or in terms of mind as a series of efforts determined by purposes. Now the only sound method of approaching this question is to consider the self as a psycho-physical whole, and to enquire how it acts. In point of fact this enquiry enables us to arrange the actions of the developed human self in a series, the first terms of which are *prima facie* mechanical in character, *i.e.* are explicable in terms of the interaction of masses, while the last are *prima facie* mental, *i.e.* are explicable only in terms of purpose. Whether this *prima facie* view can maintain itself to the end or must yield on analysis to the theory that the most developed purpose is the result of a peculiarly complex mechanism is a question which must be taken up again when the exposition of the series is complete. In the meantime we shall deal with mental activity and mental determination as we find them, and make it our business to describe the forms which they assume and the part that they play. By this means we shall trace the development of the mind-function within the self, though we shall leave open the question whether the whole of this development is or is not to be interpreted ultimately in mechanical terms.

The question thus left open is one of the ultimate nature of causation in the psycho-physical process. We shall nowhere have to challenge the view that a mental state or process implies a bodily state or process as concomitant. We shall only have to ask in the end whether as between these concomitants we are always bound to look to the bodily side for the real explanation of the process. We need not doubt that when I see a ball coming towards me and put up my hand to catch it there is a physiologically continuous process[1] from the excitement of the retinal cells to the series of muscular adjustments which results in the catch accompanying the mental acts of perception and conation. We need not doubt that when I read a book the train of reflections set up and issuing ultimately perhaps in written and spoken words of my own implies a long series of physical adjustments in cerebral cells. Only, having this circumstance before us, we must insist equally on both sides of the relation, and by so doing we may justly extend our conception of the psychical life on the one side just as we extend the physical life on the other.

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[1] Some psychologists (as Mr. MacDougall, *Body and Mind*, pp. 288, etc., cf. Sherrington, *The Integrative Action of the Nervous System*, p. 384 ff.) throw doubt on the spatial continuity of the processes involved in some mental operations. I am not qualified to form any judgment on this question. All that is meant in the text is that for the purposes of the present argument no discontinuity need be assumed.

The physical processes associated with consciousness are changes of the nature of which very little is known in the mass of interconnected nerve cells and fibres constituting the hemispheres of the brain. There is no known difference of fundamental quality between these processes and those which go forward in lower nerve centres, and which are not normally attended by consciousness, while there are many acts which are performed sometimes consciously, at other times, if attention is otherwise occupied, unconsciously. It is a fair inference that on the physical side there is no gulf between the processes attended by consciousness and those not so attended. But we have already seen that on the mental side there is true continuity of character, the conscious shading off from the clear light through every gradation of dimness to the utter dark, while that which was dark may under new conditions enter into the light. The inference is that organic processes which do not involve clear consciousness may yet include a psychical element, or, more accurately, that the psychical concomitant of neural process may be regarded as varying from a maximum to a zero point, which is perhaps reached in the cases which we shall find in which a reaction has become once for all stereotyped. Thus we may take the psycho-physical whole as a continuous unity, the differences within which are either differences of degree or at most differences of species within a genus. Our business then is to consider the general character of the behaviour of this unity, and then to set out the specific differences of its functions in such a way as to exhibit the various phases of the psychical factor from its lowest to its highest forms.

CHAPTER III

THE GENERAL FUNCTION OF MIND AND BRAIN

(1) The portion of the body with which mind is associated is the central nervous system. Now the function of the nerve tissue in general is to secure the correlation of different parts of the body in the work of adaptation to its needs and to those of the race. The temperature rises, and a nervous mechanism responds by expanding the smaller arteries, distributing the blood over the surface, and increasing the activity of the sweat glands. By these means the blood is kept to an even temperature. A blast of cold air or douche of cold water produces the reverse effects. By running or making any muscular effort we increase the carbon dioxide in the blood, and the result is to stimulate the respiratory centre to a greater activity, which causes us by panting to eliminate more carbon dioxide. As we run we catch our foot against a stone, and the other foot comes up more quickly to preserve the balance, or the hands fly out to protect the face in falling. These adaptations are performed for the most part without the aid of consciousness, which is not quick enough for them, by means of arrangements of sense organs, nerve fibres, nerve centres and muscles, which can in many cases be traced in considerable detail. The nerve fibre is essentially a conductor of excitements. It leads, say, from a cell of the retina to a cell of the mid-brain, and from this cell another fibre will proceed, conducting the excitement to a cell of the occipital lobe. Arrived at the cortex or grey matter of the occipital lobe, the excitement is propagated in a cell of 'pyramidal' form, possessing very

complex branching processes, which intertwine with the processes of neighbouring cells.[1] We explore the brain fruitlessly for any one centre to which all things are brought and from which all start anew. What we find is myriad on myriad of ramifications so arranged that any disturbance may propagate itself through the whole area and awake response from any cell whose stored-up energies are sensitive to its stimulus. Undoubtedly there must be precise conditions determining which cells will respond to a given stimulus and in what way. But as to this we know only the broad empirical fact that the response is in general one that is suitable or at least relevant to the situation, and that the effectiveness of the response depends on the maintenance of functional continuity between the nerve fibres which constitute the paths of communication. The central system appears in short as an exceedingly complex system of intercommunication, by means of which, to put the matter in very general terms, any element in our experience may be brought into relation with the whole mass of our stored-up energies in such a way as to facilitate orderly and consecutive action.

The matter may be made a little clearer by reverting to the scheme of reflex action and its inhibition as ordinarily described. If I withdraw my hand sharply from contact with a hot object the process is explained physically as a reflex. The contact with the skin is held to send a nerve excitement to a ‘ sensory ’ cell, which again propagates it to ‘ motor ’ cells, which in turn give rise to impulses descending the motor nerves and resulting in muscular contractions of the hand and arm. But if it is a point of honour or of safety not to flinch but to hold on, what happens physically, it is conceived, is that the excitement in the sensory cell passes along other fibres besides those which lead to the motor area ; that it awakens in turn other cells in different portions of the brain, and that these by one or other of the infinitely numerous connecting fibres quell the tendency of the motor centres to discharge.[1] The reflex impulse is thus inhibited, and I hold on in spite of pain. Physically the interpretation is of the same order all the way through. The difference is that in the reflex the system of intercommunication is simple, providing only for the undisturbed flow of excitement in one direction, while in the case of inhibition the system has developed, and the wave of excitement sets in motion energies in other parts of the brain-mass which cancel its original movement. The effect of this development is to bring the stimulus of the moment into relation with other and more remote vital functions, to increase the extent of correlation between different parts, or incidents, of the entire activity of the organism. And in effect it will be observed—no matter as yet by what method—the correlation transcends the present. The act is performed or restrained in virtue of effects which will accrue in the future, perhaps the remote future. At the same time the influences operating to promote or restrain it may derive from the past, perhaps the remote past. Expressing the same thing in terms of mind, what we should say of course is that present pain is discounted for the sake of some wider, deeper or remoter end, my safety or my credit. Whatever the nature of the end, the obvious point is that the experience of the moment, instead of being left isolated, is connected with other experiences contemporaneous, past and future, and perhaps with my life as a whole. Now to achieve such interconnection and thereby to order behaviour is, we may say, the generic function of Mind regarded as a factor in life, and we can thus easily see that the functions of Mind and of the nervous system are generically the same. Specifically we shall find that there are forms of correlation in which the psychical factor is unimportant or absent, while there are others which do not proceed without it, and are (at lowest) correlated with specific stages of its development.

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[1] The available evidence goes to show that the processes of different nerve-elements are not, in vertebrates, in actual contact. The point of interconnection between them is called a synapse, and it is probable that to pass the synapse the excitement has to overcome a certain resistance, the strength of which, as compared with the resistance at other synapses by which the excitement might find outlet, is probably of high importance in determining its path.

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[1] The structure of the nervous system is specially adapted to the inhibition and equally to the co-operation of reflexes by the fact that many paths of conduction unite through synapses in common paths. If two or more excitements end in the "final common path" leading to the same muscle, they naturally cancel one another if opposed and strengthen one another if allied (see Sherrington, *op. cit.* esp. Lect. IV.).

(2) The measure of this development is the area which the conscious life controls. Not only is conscious activity the only ground which we have at the outset for imputing mental activity, but further we may regard consciousness as being the organ by which the mind effects correlation. Indeed we may go further and say that, whatever the ultimate truth as to causation, at the level of development which it has reached in human beings, the psycho-physical whole, which we have called the self, does not ordinarily effect new correlation without some consciousness of what it is doing. I say "not ordinarily." In the body functions best performed and normally performed by one organ may be indirectly and cumbrously brought about by means of others. The skin performs in a rougher way some of the functions which are specifically those of the lung and the kidney, and the organism that has lost the services of any organ makes shift to do without it by bringing up reserves of energy. Yet there is no doubt in this case as to the nature and function of the specific organ. Similarly we shall see in the case of mind that correlation is slowly, indirectly and inefficiently performed outside or partly outside of consciousness, while it becomes swift, direct and efficient in proportion as it enters the conscious area. Thus if a painful experience attends a response of a certain kind at a low grade of consciousness, a fitful, uncertain and gradual modification of the response will ensue. At a higher grade the relation of the response to its consequence is definitely grasped, and there is an immediate and decisive alteration of behaviour. It is in this sense that consciousness is the organ of correlation. Perhaps the simplest evidence of its specific function is to be seen in methods of correlation which consciousness itself establishes, but which, when rendered thoroughly familiar, need no further consciousness for their execution. This is the familiar experience of our daily habits. We can walk, run, ride a bicycle and so forth without thinking

about what we are doing. We all know how that which is learnt with the expenditure of laborious and painfully conscious effort passes rapidly as it becomes perfect to the margin of the conscious area or altogether beyond its limits. But conversely in these very exercises, as soon as some conjunction occurs requiring new and perhaps unique adaptation, conscious attention comes again into play. It is through the elements that come into consciousness as such that we principally establish new correlations, and we may take as the external sign of the birth of consciousness the appearance of a permanent power of making new combinations, while the measure of the growth of consciousness, and therewith of mind, is in the extent and perfection of the combinations which we can form. In particular we shall find that the extent to which the factors influencing consciousness are themselves brought within the object of consciousness is of special importance in estimating the growth of mind.

We conceive then of the psycho-physical unity, which is the self, as the seat of mental and of physical phenomena. Under either aspect we can regard it as a unity which subsists by processes of adjustment involving the correlation of different experiences and energies. In the nervous system we see the physical basis of such correlation. In the mental life we see it clearly at work, and proceeding at its best through the medium of consciousness. Our business will be to classify the different forms of adaptive correlation and to distinguish the sphere of consciousness in each. We shall thus arrive at a conception of the development and the sphere of mind which will be true, so far as it goes, whatever interpretation we may ultimately put on the causation of mental phenomena. For this purpose we must first review the general conditions under which the whole psycho-physical unity works.

(3) *The Psycho-Physical Structure in its Development.*

Let us take any commonplace deliverance of consciousness and consider the general conditions on which it rests. As I write I hear a lark singing outside. This perception is not the effect of the lark's song alone, nor of the physical waves of air that beat upon the drum of the ear, nor of the vibration of the membrane of Corti, nor of the wave of excitement that traverses the auditory nerves. It is a reaction of something, call it as you will, mind or brain, but certainly of a preformed structure. To the fashioning of that structure there have gone in the first place certain factors of heredity, in the second certain factors of experience. Of these last the most obvious is that I have heard similar sounds before, and have connected them with a bird, and have been told in childhood that that bird is called a lark. If I had to justify my original judgment I should have presumably to advert to experiences of that kind. My perceptive judgment would appear as a kind of inference in which previous experiences figured as an inductive premise, and it is very easy here to fall into the confusion of supposing some such inference actually to take place when I merely give a thing a name. It is tempting to break up the process into elements—as (*a*) a certain sound, (*b*) the subsumption of this sound under a general conception of lark's song, and (*c*) a concluding, inferential judgment 'that is a lark.' In actual consciousness, of course, nothing of the sort takes place. What has actually happened is that past experiences have so prepared the mental structure that it reacts to a given physical stimulus with the judgment 'that is a lark.' The chain of causation is parallel to that of the analysed inference. The same elements are there, and the effect is the same, but they are never, except as now by a writer seeking an illustration, analysed out and then put together in an articulate whole. This relation is general. On all sides experience leaves results on the mind-structure which function as inferences, but are not inferences. Very often we cannot on being challenged discover through memory the experiences which have caused the modification. An object is charged with emotional suggestions, a scent or a colour-pattern stirs our liking or disliking, and we can find in the recesses of memory no experience to account for it. The results of old experiences are for us woven into the texture of the object. More accurately they have come to qualify our perceptive reaction to a stimulus.

The content of this perception therefore, and in particular the feeling-tone which qualifies it, may be said to stand for and reflect in the mind the nature of the experience, perhaps of a whole mass of experiences, in which similar perceptions have in our previous history been concerned.

(4) But it is not only our own history which forms our mental structure. The experience on which a suggestion rests may be irrecoverable by memory, for the simple reason that it never occurred within the range of memory. The mind, as part of the whole psycho-physical structure, grows up under the influence of heredity as a whole, and in its several parts it arises, survives and is modified from generation to generation in accordance with vital needs. The main need which the mind functions subserve is that of directing response to the environment, and the direction must in the main be that which tends to the preservation of race. Under these influences arises a mind-structure endowed with definite tendencies of reaction, quick, for instance, to respond with perception to certain external movements which threaten the safety of the organism, and not only with perception, but with appropriate motion and appropriate feeling. Here again we must in any individual case be on our guard against the old fallacy. When we see a fish dart away in response to a sudden movement of our own we must not hastily impute to the fish a series of distinct operations—such as the perception of a moving object, a fear of attack, and resolution to fly. For all we know the fish may be capable neither of perception, emotion or resolve. What we see is the responsive motion which would be logically justified by the fear of danger, which fear again might be logically justified by an experience of men and of their unkind dealings with fish. If the fish is capable of mental processes, and if these mental processes correspond, as they may, to certain of the lower processes of our own mind, we may put it that what actually passes in the supposed case is a process which contains all the elements enumerated in germ, but none of them in maturity or distinctness.

For among ourselves the primal basis of our reactions is not reflective. It is not even due to experience. It is a part of that original equipment which we call hereditary,[1] or in more familiar phrase it is instinctive. This hereditary element is not to be confined to certain specific elements in our mental life, to certain 'forms of thought,' certain principles of will, certain types of emotion. No doubt there are points at which its influence is more distinct, less overlaid by the effects of social tradition and personal experience. But rightly understood it permeates the entire life of mind. In a sense its operation is most decisive in the very department which is singled out as the especial preserve of personal experience, the department of 'pure' sensation. So far as a sensation is 'pure,' that is to say is unmodified by elements of thought or by the unconscious operation of previous experience, it represents the naked reaction of the hereditary structure of mind on the given stimulus. The poppies are red and the oak leaves green to us because our organism is so constructed as to react to the physical stimulus of vibrations of different wave-lengths with those two sensations. That the one object is a red poppy and the other an oak leaf are judgments in which something more than pure sensation is involved. That they are red objects is a judgment in which something more is involved. That the names red and green apply to them are judgments in which something more is involved. But in the quality of the sensation 'red,' 'green,' we come as near as we ever can to pure sensation, and therewith we come to that which depends on the original hereditary endowment of the mind-structure. This element will be found accordingly to pervade our judgments of external things. It is even more obviously present in our feelings and our impulses. It is operative in our judgments and inferences. It is the original foundation of our temperament and character. But all along, until we reach the highest stages of reflection, it is in its operation unconscious. That is to say it determines our mode of reaction, decides the way in which we take things without our knowledge of its operation. Though a man may in part know himself in the sense of being aware of certain idiosyncrasies of temper and on his guard against them, it is only science dealing with nerve and brain, heredity, education, and the reaction of body and mind that can render in fully explicit terms the true nature and limits of the hereditary factor.

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[1] We know not where to look for the source of any element in our original equipment except in the physical antecedents of our birth. So we call the whole of it hereditary. But (*a*) there may be other sources of which at present we know nothing, and (*b*) the use of the term 'hereditary' does not imply any specific measure of likeness to our parents. Our inheritance is the union of gametes of which our parents are the carriers and may contain elements not developed in either of them, but perhaps in an ancestor or a collateral, or, in their totality, never, except in the unique combination which is one of us.

(5) Enough, however, will have been said to show that the ground layer of mind is a property of the hereditary structure. Upon this foundation experience works, but the result at any moment is not to be severed by any mechanical process into effects of experience and effects of heredity. The result is the product of a continuous process of interaction, and will accordingly be a function of both the contributory factors. There is, however, one element common to the two. The hereditary element is itself shaped indirectly by the experience of the ancestral stock. The stock has had to live and act within a world of experience which is on the whole the same world, and it has had to adapt itself to that world or perish. Hence, in the basis of the individual constitution lie tendencies, modes of feeling, promptings of action making in the main for sanity, making at least for the race preserving as against the race destructive line of conduct. These tendencies may be so precise and complete as to determine action without the need of any individual experience to perfect them. They then form the basis of inherited reflexes or instincts. Or they may be vaguer and more general, and may figure accordingly as promptings, tendencies, characteristics, or mere potentialities which the experience of life serves to define and complete. The first and more developed form plays the more important part in animal life where the scope of consciousness is smaller. As the sphere of conscious correlation grows so there is less room for fully developed specifically determined modes of reaction, and the function of the pre-

existing structure is rather to form a basis for correlations which are constantly effected anew by fresh mental efforts. Hence, though the hereditary equipment of man is not poorer but richer than that of the animal, it is an equipment which is less complete in itself and leaves more scope for the exercise of initiative. Man has many instinctive tendencies, but few instincts complete in themselves.

At any rate, what we have to emphasise here as of the first importance to the student of consciousness in its development is the existence of a permanent background, the work of the massive inarticulate action of ancestral experience as modified by the half-articulate action of personal experience and the social atmosphere. These forces together form that permanent basis of our thought, action and feeling which Lady Welby has called the mother-sense. This is something less specific than instinct, judgment, inference, or will. It is not so much the immediate determinant of specific acts, though it does lead to specific acts—to precisely those acts which we perform with confidence, though admittedly without being able to give our reasons. It barely enters into consciousness as a distinct force, though it is often what lies close upon the verge of the luminous area when we claim an 'intuitive' certainty of something, when a situation impresses us as hopeful or threatening, or a personality as attractive or repulsive without tangible ground. In another aspect it is itself closely allied to the foundations of that same 'personality' which impresses, or fails to impress, others, in apparent defiance of the qualities that men praise or blame, admire or condemn. It is as the enveloping atmosphere of the conscious life, or to take a different metaphor it is a mother-substance, a matrix out of which clear-cut contents of consciousness, explicit judgments, purposes, stated reasons can be taken. But what is to be remarked about the contents so taken is that in the process of cutting they are often more or less mutilated. If we seek, for example, to analyse the qualities of someone whom we admire, we succeed perhaps in fixing certain points. We can formulate the basis of our judgment to a certain extent, but very often we are quite conscious that this is not the whole account of the matter, and when we are not so conscious we no less often mistake ourselves, and impute reasons which are inadequate and unreal. The distinct quality assigned as the basis of a feeling or a judgment is, in short, the result of an effort of analysis, and analysis is a partial attempt to crystallise what is fluid, or to distinguish and map out what is originally present in consciousness as a whole. Now this process of distinction and systematisation is the basis of all the higher developments of mind. But it is at the same time to be understood that it arises and performs its functions within the sphere of the 'mother-sense,' and its business is to replace the unreflective deliverance of the mother-sense by an articulate system of thought. In one sense the defined idea is from the first an advance upon the obscurer reactions of the mother-sense. It is more articulate, more rational. It is a necessary step towards the full consciousness of developed mentality. But in its use there lurks from the first a source of fallacy—the danger of being guided by a partial and incomplete analysis, a danger which may lead to practical mistakes from which the simple confidence in the untroubled mother-sense might be free. What we can satisfactorily formulate being seldom more than a part of the reasons really influencing us may omit something that is essential, and so we get all the errors of the 'abstract' type of mind. Of these we shall have something to say at a later stage. In the study of mental evolution they may best be guarded against by bearing constantly in mind that explicit consciousness does not suddenly rise in full definiteness out of the void, but emerges within the sphere of the mother-sense and remains until the highest stage of its growth under the influence of forces which it comprehends imperfectly or not at all.

Our argument then has led us to conceive Mind, whether in man or brute, as part of a psycho-physical structure which grows under the conditions of heredity and is modified in each individual by experience. This structure reacts in accordance with the laws of its constitution to that part of the environment with which it comes in contact, in such a way generally as to adapt the actions of the organism to the needs of race-maintenance. The method of adaptation in which Mind is specially concerned is the correlation of one experience or one act with others, and we may regard all such correlation as partaking of psychical character. Its special organ is consciousness without which new correlations are only effected indirectly and cumbrously. The development of Mind can accordingly be measured by the nature of the correlations effected and the conditions under which they are effected, and in comparing these we shall find every gradation from the case where the activity of consciousness is at zero, to that in which it is the effective determinant of the entire function.

CHAPTER IV

MENTAL DEVELOPMENT IN THE INDIVIDUAL

1. In mental as in physical evolution the emergence of new factors does not involve the total disappearance of the old. These are merely overlaid and in varying degree modified by the later development. Just as man remains an animal, so the most reflective consciousness coexists with the most irrational impulse and the life of the most perfect and complete human being has its roots in methods of action and reaction which it shares not only with the life of the savage or of the dog, but with that of the rhizopod or the plant. Thus we get in the developed man a rough epitome of the history of the race, we find in him modes of action which represent all the stages which the race has passed through. The correspondence is not indeed accurate, for the presence of new factors modifies the operation of those which are older, but (as in embryology) it is sufficiently near to enable us to form a rough outline of the evolutionary process, an outline which we can verify and correct by comparison with the actual behaviour of animals at different grades of development.

We may therefore suitably approach our task by distinguishing the elements discoverable in the activity of the developed man, and considering their analogues in the animal world. In doing so, since we conceive the organism as a psycho-physical unity, we shall take physical reactions into account along with the deliverances of consciousness, using, in any case, the evidence most readily accessible and most easily verifiable.

Having taken correlation to be the typical function of mind in relation to the life of the organism, we shall found our classification of reactions on the nature and conditions of the correlations involved. Now, generically correlation is a term applied to the parts of a whole when they are so arranged that their joint operation yields a result tending to the maintenance of the whole or of some function, character, or activity of the whole.[1] The source and nature of the arrangement may be very various. In a machine it is one thing, in an organism another, in the colour scheme of a picture a third, in the concatenation of acts that constitute a purpose a fourth. But in all these cases there is an ordered whole consisting perhaps of physical parts, perhaps of successive acts and events, and in all, whether by the operation of one element on another, or by two or more elements acting in conjunction, the whole is formed, or maintained, or modified, as the case may be.[2]

We have spoken of consciousness as a special organ of correlation. But we must distinguish between the correlation which is effected in consciousness and the correlation which is effected by consciousness. Consciousness, at any rate in its more developed phases, has before it at any moment many elements. Among these it moves selectively, bringing into a connected whole those which stand in some definite relation to one another and to its dominant interest. This is a correlation effected within the conscious area, though it may have the effect of bringing within that area elements which would otherwise not be there. Thus I grasp certain visual and tangible data and recognise a book on psychology, which, operating on the prevailing train of interest, reminds me of a passage on a certain page which I can hunt up. The joint function which the several elements combine to form is, say, the judgment that a reference that I need will be found somewhere in Chapter X. of the book before me.

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[1] It must be borne in mind that an organic whole is maintained not against all modification, but constantly through some modification.

[2] As a matter of terminology, the elements may be described as correlated with one another in subservience to the result or as correlated collectively or individually with the result.

This is correlation in consciousness. But this act has wider bearings. It is a step in the train of actions by which I bring my past reading to bear on the whole task of writing this book. It helps to correlate a long train of experience with a long series of co-ordinated activities. This is a correlation effected by that and other acts of consciousness together. Now the whole of both trains may also be grasped by consciousness more or less adequately in a single act and in that sense become a correlation in consciousness. But in the first place, that will be another act of consciousness quite distinct from the first and more comprehensive; in the second place, a mind capable of the lesser, simpler synthesis might not be capable of the wider one, so that it might build without ever knowing what it is building or reviewing what it has built. The elements correlated in consciousness then do not necessarily coincide with the factors of life correlated by consciousness, and in comparing different phases of correlation we must take account both of what goes on within the conscious area and of what is effected thereby. Again, if the two things do coincide, it may be only the correlation effected by consciousness that is susceptible of proof. We have no direct knowledge of that which passes in the mind of another. We judge analogically on the basis of our own experience and of the behaviour of others.

This caution has a special bearing in the field of animal psychology. For here behaviour differs so far from the human as to throw a shadow of doubt on all interpretations of what is actually passing in the animal mind. The solid basis of our argument is always the correlation which the organism actually effects. We find, for example, certain external stimuli affecting the organism. We find subsequently a certain modification of behaviour conducing to a result beneficial to the organism and bearing a definable relation to the stimuli. That in such a case the effects of certain experiences are so brought into relation by forces acting within the organism as to conduce to its benefit, is then a hypothesis susceptible of the ordinary methods of inductive proof or disproof, and the result is independent of any theory of the precise mechanism by which the correlation is effected. Generally, then, our problem is to distinguish forms of correlation according to the data which may enter into them in each case and the use made of these data. So far as we discover *exact* correspondence with any human function, *e.g.* consciousness, we shall not hesitate to ascribe the same mechanism to an animal. But this is a secondary inference always dependent on the establishment of a definite mode of correlation, always open to an element of doubt, at any rate as to details, and fortunately of quite subordinate importance to our general purpose. The reader must understand generally that where we use terms involving consciousness of an animal we mean to allege a function corresponding in its causes and effects to the function in man described by those terms. Though we may reasonably presume such a function to be in itself similar to a conscious process of our own, this presumption will not form a premise in our reasoning.

Lastly, it must be remarked that correlation in order to be fully understood has often to be viewed under more than one aspect. Here is a series of acts directed to a particular end. We may describe the way in which they are correlated for that purpose without looking beyond the acts themselves. But if we ask how the adaptation came about we may have to look to the past experience of the individual and even to that of the race. This is another aspect of correlation. It is through the peculiar character of the organism which preserves the effect of the past that the adaptation in question has come about. The past may be conceived as acting on the present in the sense that it is represented by certain internal forces which co-operate with present conditions to produce the given adaptation. We may speak of this within the terms of our definition as a correlation of the present and past, and the exact way in which past and present are correlated is one of the distinctive marks of a given stage or form of activity. Again, while all correlation is directed to the future in the sense that it is such as to produce a result of interest to the organism, what that future is, how far it extends, and generally how the present activity is correlated with it, are questions on which a great deal turns. Thus at each stage, whether we are examining what passes in consciousness or what is effected by consciousness, we shall have always to ask what precisely is the nature of the correlation between the present act and the past, on the one hand, and the future on the other.

2. We deal with conscious processes throughout then in their capacity of correlating functions. But, further, though consciousness is the special organ of correlation, it is not even in man the sole method, and among lower organisms it—or its analogue—is not even the most important method. Our task then is not merely to analyse consciousness, but, more generally, to consider the kind of correlation that we find in the acts of organisms and in particular of men. We shall distinguish responses to the environment from this point of view. There will be first action in which no correlation appears, and then among correlated activities there will be different types or species of correlation. These will be found to differ (*a*) according to the function of the present organic condition, and particularly to the way in which this condition is expressed in conscious effort, (*b*) according to the part played by the living experience of the individual or by causes acting on the individual only through his experience as compared with the part played by the hereditary structure. We shall distinguish accordingly correlation resting on heredity, correlation resting on co-present conditions and correlation resting on past experience, and of each we shall find distinct species.

A. NON-CORRELATED OR SPORADIC ACTION

3. A man subject to nervous shock and unable to control himself throws his limbs about, twists his body, utters cries, or swears meaninglessly. The excessive excitement produces general muscular contractions which have no specific functions, though they may give indirect relief by draining off pent-up stores of nervous energy. If we are dealing with any obstacle which we utterly fail to understand, action, particularly if we lose our heads,

tends to relapse into this convulsive meaningless form. In such a case we touch bottom. We sink to the lowest level at which not only all that is rational in action, but all that is adaptive and useful is eliminated. We have a general discharge of excitement permeating all available channels without differentiation. In the higher organisms such channels are clearly marked, and the excitement will always run mainly along nerve fibres and will affect the tissues innervated, not only the muscles but of course the viscera. Indeed, the imperative need felt for muscular action in cases of powerful emotion probably arises from the necessity of relieving heart, lungs, stomach and bowels from the strain which otherwise falls exclusively on them and produces intense discomfort and possibly serious ill effects. In the lowest organisms the channels are less distinct, and excitements sometimes propagate themselves through the whole mass of protoplasm. If there were no channels at all there would be a wholly undifferentiated discharge, yielding a quite random reaction to any and every kind of stimulus. Whether such complete absence of differentiation has ever existed may be questioned. But we can recognise the existence of discharges which are undifferentiated in the sense that they permeate all available channels indifferently. Such discharges occur in man mainly where purposive action fails or where the excitement is too strong to be readily contained, but if neither purpose nor any other form of adaptive correlation existed they would be normal. Undifferentiated discharges with the random actions to which they give rise are what remain when all correlation is taken away. Conversely, we may regard them as the material out of which those forms of reaction are selected which tend to secure the vital needs of the organism.

B. CORRELATED ACTION

I. CORRELATION BY HEREDITY

(1) *Structural Activity.*

Uncorrelated action, it need hardly be said, is the exception in animal life. In all living beings normal behaviour runs on lines which roughly or accurately, in broad sweep or in detailed precision, coincide with the temporary or permanent requirements of the organism. At the basis of this adjustment lie the modes of action which depend directly on the physical structure and are therefore part of the hereditary equipment. These actions may occur in response to external stimuli, and as such we shall meet them again in the next section under the name of reflexes, or they may proceed from internal forces maintaining by their interaction a rhythm of change. In the latter case, however, which we take first, the structural activity may often be increased, arrested or modified by external events and it may need something external to work upon. It is not therefore easy in practice to keep the two types distinct. Digestion is a process determined by the correlated action of a number of internal forces, but that digestion may begin there must of course be food taken in from without and the character of the food will affect details of the digestive process. So for respiration there must be an atmosphere, and the amount of oxygen in the atmosphere will affect the respiratory process, and through it the details of the circulation which is otherwise much nearer to a true 'automatic' function. Still, among ourselves, the vital processes as a whole are determined mainly by the interacting forces[1] involved in the structure of heart, lungs, alimentary canal and nervous system, and form together the going concern, the self-maintaining process which is life. Far from being purely dependent on external things to set it going, if this process does not meet with the elements of the environment appropriate to it, *e.g.* oxygen or food, it sets up cravings and ultimately movements of the entire body which tend to supply the deficiency. These movements, again, are movements of limbs, arms and legs, hands and feet, determined in type by their structure. So, though the precise direction of the movement may differ indefinitely according to circumstances, there is even for highly developed behaviour a generic basis in the physical organisation which is part of the hereditary equipment.

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[1] It must be borne in mind that these forces may be set in motion by internal stimuli, and in that sense be reflex. This, however, would not destroy their independence of external stimuli which is for the moment in question.

Such type reactions are readily verifiable in the lowest animals, and it is possible for a good observer to give a fairly complete inventory of the 'action system' of a Rhizopod or an Infusorian. The animal is in constant movement of the parts or the whole. The movements are not dependent on any special stimuli. They go on 'of themselves' under normal conditions, though they are affected in detail by the temporary state of the animal, *e.g.* by emptiness or satiety. Finally, they serve the simple life-needs, absorbing food, sometimes (not always) rejecting unsuitable matter, avoiding harmful objects, and (principally by the indirect method of avoiding other regions) guiding the animal to a suitable environment. In the successful maintenance of this behaviour there is often need for a special combination of particular actions, and here there is room for a certain variation from case to case. But the elements of the combination are always easily recognisable type reactions, the beat of cilia, movements of the body on its axis, contractions to this side and that, or whatever it be. There is always a need for definite responses to certain stimuli if these occur, but the evidence is clear that the normal activity is not merely a series of responses to special stimuli, but the outcome of the internal forces of the organism, that is to say, of the congenital structure.[1] As such we may speak of it as inherent structural activity,[2] and we may lay it down that the simplest and most general form of correlation in behaviour is the broad adaptation of the lines of action to the general needs of life affected by the congenital structure in accordance with its internal forces. The cause of this correlation according to ordinary biological theory is inheritance from generations whose individuals survived or perished in proportion as their structure was well or ill adapted to life conditions. The degree of correlation thus determined by the structure represents, therefore, the sum of all previous adaptations of a successful kind.

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[1] The remarks of Loeb and others (Sixth International Congress of Psychology, 1910) do not so much as touch the facts reported by Jennings in his masterly *Behaviour of the Lower Organisms* (1906).

[2] The term 'structural activity' would, as will be seen immediately, include the reflex. The qualification 'inherent' distinguishes actions or those elements in action which depend on internal forces from those requiring a special stimulus to set them going.

(2) *Reflex Action.*

But life cannot depend on internal forces alone. The organism is constantly meeting changes in the environment, and it must be somehow fitted to deal with these or it will perish. The structure must respond to changes as to a stimulus, and the response must be one normally suited to the requirements of the organism in relation to the stimulus.

The most elementary form of such response is known as a Reflex act. It is one in which the stimulus of an external object calls forth a uniform response on the part of an organic structure.[1] Thus the touch of something sharp or hot sets up muscular contractions or results in the withdrawal of the limb. The contact of a crumb with the windpipe induces a cough, a touch on the pseudopodium or limb of protoplasm which a rhizopod puts forth causes it to shrink up and withdraw. Normally the reflex act serves a perfectly intelligible function in the life of the organism—thus in all the instances given it helps to protect from possible injury. But though it serves this function it would be a mistake to infer that it is performed because it serves it. This would be true at best only in a very roundabout sense which we shall presently consider. We have first to note that the precise differentia of the reflex is its unintelligent and quasi-mechanical character.

To begin with, consciousness plays no essential part in it. I am conscious of sneezing, but the consciousness is here a mere effect, and the sneeze carries itself out automatically and even against my will. I blink without knowing it, and cannot help blinking even when I know that there is no danger to my eyes. The reflex may even be injurious, for it is adapted only to the normal, and yet it may be difficult or impossible to control it, and so the smallpox patient has to be forcibly prevented from scratching himself. The reflex in short is not like a purposive act directly adapted to the circumstances in which it is performed in such wise as to secure a specific end. It is the result of a preformed structure adapted in general to secure a result of a certain kind in response to a stimulus of a certain kind. The result is normally beneficial, but not necessarily so, and no provision is made within the limits of the reflex structure for deviations from the ordinary type. If we ask how the structure has arisen the answer on the well known biological lines is the same as that proposed for inherent structural activity. It was through relatively small variations, each of which was upon the whole beneficial to its possessor. How such variations arise in the first place we have seen to be the unsolved problem. The only certainty is that the general suitability of the reflex response to the needs of the species is the condition of its maintenance, but once established its actual suitability in any particular case where it is performed has nothing to do with its performance. It is adapted to needs though not at any time determined purposively by the needs which it subserves. We may express the distinction by calling it adaptive and not purposive, and we observe that in such adaptive responses, while there is a certain correlation between response and requirement, (1) this correlation is general, assigning a definite type of action to a definite type of stimulus without provision for variation of circumstances, (2) it is sensory, affecting only responses to a definite present sense-stimulus, (3) it is effected entirely outside the sphere of conscious operation, and (4) it comes about slowly and indirectly through the massive operation of generations of ancestral experience. Such, in fact, is the general character of action which is not purposive but adaptive and is determined not by the relation of the present to the future but entirely by the cumulative and indirect effects of the past. For, *mutatis mutandis*, what has been said is probably applicable in equal measure to structural activity. It is the character of type-reaction in general, *i.e.* of all correlation so far as fixed by structure under the conditions of heredity.

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[1] The reflex may be inhibited or modified by other parts of the organic structure. But as long as we have evidence that the tendency to react belongs to the structure as such in relation to the stimulus as such we can call the response a reflex. *V.* Sherrington, *The Integrative Action of the Nervous System*, p. 7 *seq.*

II. CORRELATION BY CO-EXISTENT CONDITIONS

(1) *Equilibration.*

It would however give a false impression of the operation of either form of type-reaction to speak of them without qualification as unvarying. In both relations we constantly find that the condition of the organism, concomitant stimuli and the relation of the organism to other things have their effect, controlling, limiting, possibly suppressing a reaction or adjusting one type-reaction to another in a combination or a series by which a certain result is obtained. For instance, an infusorian as it swims encounters alkaline matter. It starts back a little way, reversing the movement of its cilia. This may be taken as a reflex. But it is succeeded by a typical exploratory motion which ends in the animal's moving forward at a different angle. If the new motion again brings it into contact with the alkali the process is repeated and it continues until a direction is reached which takes it from the alkali altogether, when these reactions cease and the ordinary forward movement proceeds. Putting many such instances together we may say that there is for the organism a certain condition in which its ordinary structural activities go equably forward. Any disturbance of their equilibrium is a stimulus to reactions which continue until the equilibrium is restored. This may be achieved by a normal sequence of reactions, but if not there will be some variation from the normal, perhaps some suitable modification, perhaps merely heightened and continued activity —continued that is, until the disturbance begins to paralyse the powers of the organism. In higher stages we recognise this condition without ambiguity as one of effort. At lowest, we must regard it as one in which the co-present organic conditions modify the type-reactions, repeating or combining them in such ways as remove a disturbance. The action tending to remove the trouble is chosen out of many possibilities, and if it does not succeed the animal persists till relief is obtained. On the other hand, as soon as equilibrium is gained the 'efforts' cease, and the normal type of activity is restored. Among ourselves such efforts, often random enough, are guided by some pressing discomfort, and the equilibrium is for us comfort. Whether we can always impute an analogous consciousness when we see similar behaviour may be matter of controversy. What is clear is that here we have actions directed to a certain result and something maintaining them as being so directed. This we shall see is at least the germ of effort and purpose. We may call it conation, defining conation generically as action dependent on the difference between the existing state of the organism and some other state which it directly or indirectly tends to bring about. In the cases taken, the conation involves a correlation of the acts of the animal with the co-existent conditions external and internal in a manner tending to organic equilibrium. Correlation is no longer effected merely by heredity and the past. Whether resting on consciousness or not, it is certainly something effected by the individual in the present for itself.

(2) *Sensori-motor action.*

So far the governing organic activity has been considered mainly as heightening and sustaining type-reactions as long as disturbance continues. We pass next to cases in which it appears to assume a more decided function of direction. Our first illustrations of this may be drawn from human behaviour, and they may best be understood by taking a reflex as the point of departure.

A reflex response may take the shape of an action directed to, and in a sense by the object which stimulates it. A baby's fingers close automatically on a pencil brought into contact with them. Its lips suck anything with which they come into contact. A few weeks later it grasps at anything that it sees and tries to convey it to its mouth.

In these cases the reflex response may be regarded as a series of muscular contractions so graded and combined as to result in a movement definitely related to the position which the stimulating object happens to occupy. There is in them, therefore, something individual. There is a certain departure from that bare generic correlation which we regarded above as characteristic of the reflex, and in proportion as the elementary contractions that make up the response are seen to be so co-ordinated as to yield the particular motion required by the circumstances of the moment—to be dominated and guided by the position and perhaps even by the motions of the stimulating object—there is something which suggests purpose rather than that blind execution of its function by a preformed structure which we took as distinguishing the reflex pure and simple. There is also something more than the mere pressure of continued disturbance maintaining an activity that tends to relieve it. There is a more definite guidance of action in relation to an external object. Now, behaviour of this sort is externally ambiguous in character and it is exceedingly hard to decide in any individual case, particularly in the animal world, how it should be classified. What we have to do here, however, is to distinguish types of action by virtue of the conditions involved, and for the moment we have to deal with a type which differs externally from the reflex by its nicer adjustment to outer objects.

Among ourselves responses so adjusted are almost all acquired by practice. The grasping reflex is, I believe, an exception, but it is a response of a very simple character. The action of *grasping at* a thing seen is not an exception. It is at first ill performed—the child 'grasps at the moon'—and is perfected with practice. The higher adaptations of this kind, *e.g.* the delicate adjustments required in skating, shaving, cycling, tennis playing, are formed in response to conscious purpose, but the part which purpose plays in forming them is peculiar. It stimulates us to make the effort, to persist in the face of failure, to submit to tuition. But as every learner of a new art knows, it does not serve to direct the particular grade of effort or combination of movements which actually succeeds. Success comes gradually and unconsciously. We do the thing badly many times, and begin, by a process which we cannot explain, to do it well. We keep on falling now to the right and now to the left till slowly we discover that somehow the balance is coming. Thus though conscious purpose inspires the effort it does not tell us how we shape the adjustments through which the effort succeeds, and for the moment it is the nature of these adjustments which we are considering. What then is the part which consciousness plays ? To deal with this question let us leave the process of learning for the present, and consider first the acquired art. Here it is pretty clear from common experience that so far as we are successful in executing what we have learnt, consciousness is concentrated on the object of perception, not on the act nor on its results. The batsman concentrates his whole mind on the ball as it comes towards him, and this perception discharges automatically (*i.e.* by processes in which consciousness plays no direct part) the proper movements of the bat. If he ' places ' the ball successfully in a direction where he had observed a gap in the field, this is the consequence of a previous observation still operating on the fringe of consciousness, but not in such a way as to impair the focussing of the percept. The motion thus seems to follow on the sense perception without the further intervention of consciousness. Conscious perception leads direct to motion, and so we speak of responses of this type as sensori-motor actions.

What is the precise function of consciousness in these cases ? We have as the basis of the skilled act a structure fitted to respond to stimuli of a certain order. But a structure, as we have seen, can only be adapted to general requirements, *i.e.* to meet a certain type of stimulus, A, with a type of response α and a type B with a response β, the response in each case being that which is generally suitable. Now, what happens in any matter requiring much skill in the treatment is that the situations are often unique, that what is wanted is not α or β, but a certain combination of α with β, involving perhaps some grading or modification of each. The function of the close conscious attention to the precise position, distance, movement, size, etc., of the object dealt with at any moment is to combine or correlate these distinct data, to yield us the precise combination, A-B, of sense-elements which corresponds accurately to the situation as a whole. Each element in this combination discharges its appropriate motor impulse α, β, but their union in consciousness effects through a machinery which does not enter into consciousness a corresponding modification of impulse by impulse, of α by β. The precise function of consciousness then in sensori-motor action is to grasp the unique combination of stimuli, each of which having its special reaction modified by the concomitant reactions, there follows a response appropriate to the unique situation as a whole.

In man all skill is acquired, and few, if any, sensori-motor adjustments are wholly innate. But among the lower animals the hereditary mechanism plays a larger part. The pecking of a chick, the spinning of a spider's web, are highly developed (though not perfect) from birth, and there is no reason to deny that such adjustments might be fully perfected by heredity. But in any such case one of two things would seem to hold. Either the adjustment must be such that every variation in the position or movement of the object to be dealt with can call out a response which will be suitable in the great majority of cases—a type response. In that event a preformed machinery can deal with the situation. Or if that is impossible, if, say, the possible movements of a prey are so individual and uncertain that no two situations will be alike, then we must infer a function capable of dealing with the novel and the individual. That will be a function identical in its operation with the conscious attention to the object which we have noted in the parallel case among ourselves. There is no difficulty in supposing this function to operate on the basis of a hereditary structure just as it operates on a structure which is modified and improved by practice. To crouch and spring are hereditary modes of action. Just how long to crouch, and when and how to spring will be determined by the keen-eyed watching of the behaviour of this particular prey. Much of the more complex activity of the lower animals may be and probably is of this type. That is, it is sensori-motor action where a hereditary structure is guided in its response by a sense-synthesis of the objects with which it has to deal.

In either case, whether it is operating upon an inherited or an acquired structure, how consciousness effects the suitable response is unknown. All that we can say about it is negative. Though it is consciousness its method is unconscious. We see, we watch closely, and then we strike and hit the mark. What is correlated in consciousness is a mass of percepts, the ball coming towards us, its successive movements, the ground, the position of men in the field, and some elements perhaps of our own motions in raising the bat. The result is a boundary hit, of the mechanism of which at the moment we can give no account, while if we try to attend to it, it only distracts us. It goes off in accordance with the structure furnished by heredity or by experience or both combined, stable enough to give results of the right type, plastic enough to respond to the particular combination of impressions which consciousness effects. The function of consciousness in sensori-motor action is not to correlate the present with the past or the future, but to correlate the data of the present with one another in a way which effects a corresponding correlation of the functions of pre-existing structure, whether that structure were formed entirely by heredity or in part by experience. What is effected in consciousness is a union of sense data governing a conation. What is effected by this union is the adjustment of general tendencies to given variations in individual cases. Conversely, where we find such adjustment as a regular incident of life, we are justified in attributing it to consciousness, since consciousness is for us essentially the organ for effecting novel and unique combinations. Sensori-motor action then is probably the earliest verifiable function of consciousness, as it is certainly one of the most widespread.[1]

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[1] What sort of awareness an amoeba may have of its prey we cannot tell, but no one can read Mr. Jennings' account of an amoeba hunt

(3) *Instinct.*

We have conceived sensori-motor response as governed by the needs of the moment rather than the future. It may serve the future, however, and that for one of two reasons. First, the mind may be dominated by a purpose. In that case, while the purpose lasts there will be satisfaction only in that which tends to forward it, and dissatisfaction with everything else. It fixes the feeling tone[1] which constitutes the co-present organic condition dominating each adjustment from moment to moment. Thus, in the game the desire to win is present in the form of a tension, stimulating and directing each sensori-motor response. The response is guided and adjusted to the act which at any given moment relieves the tension, and as under the influence of intelligent purpose the act which relieves the tension, which satisfies, or establishes momentary equilibrium, is normally one which brings us nearer to the end, the result is that the purpose gets itself accomplished.

But without the formation of purpose it is possible that actions should be co-ordinated in series, so as to produce results of importance to the organism. This brings us to the second method in which sensori-motor response may serve the future. Just as the hereditary structure may determine a reflex response, which performs a function without intelligence or purpose, so it may determine a tension of feeling guiding a train of sensori-motor acts—and indeed of structural and reflex acts along with them—and persisting till a result of importance to the organism is attained. Trains of action so determined are generically instincts. We may conceive that where there is a well-developed instinct, but little or no intelligence, the train of action is determined by a tension, which at any given

without receiving the strong impression that the behaviour is of sensori-motor type. It is of course possible that analysis may ultimately resolve it into a series of type actions, in which the peculiar combination is due to the successive actions of the prey, but as it stands the evidence is all the other way. So far as our information goes then consciousness must be carried down to the lowest animal types.

[1] On the assumptions involved in postulating feeling a few words are said in another connection. See below, Ch. V. § 3, p. 68.

point is satisfied only by a performance which falls in with the course leading up to the final accomplishment of the result, and by no other. The solitary wasp dragging a spider to its hole does not act altogether mechanically, nor altogether intelligently. But it is not satisfied till it gets the spider into the hole. That result, and no other, relieves the tension. Where intelligence arises within the sphere of instinct, it probably takes short views at the outset, and aims at near results, which will relieve the tension and so satisfy. From these it advances step by step till it grasps the end of the instinct, which then becomes suffused with purpose.

Among the higher animals, but particularly among the most developed insects, there are long trains of intricately adjusted actions, which can be conclusively shown to be independent of any intelligent apprehension of their ultimate end, though they may use a measure of dawning intelligence in the manner indicated in executing certain steps. These form the instincts proper, and of their genesis we can only repeat what has been said of reflexes and of structure in general. They arise from variations, the original source of which is unknown, but which depend for their permanence on their suitability to the requirements of the species. In the case of the reflex, what comes about is a structure adjusted so as to respond to a sense stimulus in a manner which serves a need. In the case of the instinct, the adjustment is more complex. There is first a tension which continues or recurs until a need is met, and secondly, an adjustment which secures that this tension is at any given moment relieved by the action which under the circumstances is in the train tending to serve the need. The state of momentary equilibrium or satisfaction, that is to say, is adjusted to the appropriate combination of objects and actions. It determines that sensori-motor adjustment which is in fact required by the organic need, and as the tension is constantly revived till the need is met it governs a train of adjustments which are in the end successful.[1] Instinct may, I think, be definitely distinguished from a compound reflex as determining sensori-motor adjustment, and as such its basis must be held to involve consciousness.

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[1] Note here the development of conation involved in the evolution of instinct. We saw above that conation was involved in the maintenance

As intelligence arises and directs action to ends remote from the momentary situation, the need for the successive adjustment of feeling to each detail in a train of actions disappears, and the mind gains its freedom. Among ourselves, accordingly, we do not find such intricately dovetailed series of acts determined by heredity as appear in the animal world. But (*a*) we still respond to many perceptions and situations with a feeling which popular psychology calls instinctive, but which is really rather of the nature of a reflex consciousness. The feeling of resentment at an attack is as spontaneous and unreflective as the muscular movements of the counterblow. (*b*) We still have the permanent interests in the race preserving functions—the satisfaction of organic needs, sexual attraction, parental love. Indeed the whole vaguer mass of the social feelings are in their basis hereditary. But we are not guided merely by instinct, because the power of looking at life as a whole brings our various dispositions and tendencies into relation with one another. We are not to conceive the hereditary endowment of man as consisting in a number of separate instincts so much as in the temperament and character, that basis or background of life which, suffused as we grow up with experience, tends to determine how we will take things, how we will regard fresh

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or recovery of the optimum or equilibrium state in the presence of disturbing causes. The term was justified on the ground that the reactions were determined by the difference between the existing state of the organism and another state, which they tend to introduce—this other state being one of 'equilibrium.' In the case of instinct, the equilibrium itself is at any moment a state of tension or conation. It is a state of excitement dependent on the difference between the existing conditions of the organism, and the conditions at the time when the instinct function is complete, and through its effects on action at each moment it tends to produce the state which terminates its activity. Conation develops then from the determination of action by reference to the equilibrium point, to the determination of the equilibrium point itself by reference to extended vital processes. Finally, the relation between the present state and the result to which it tends may come into consciousness, and in proportion as it does so the conation becomes a purpose.

experience, and weave it into the whole of our life. Reason and will are with us as hereditary as any capacity to feel or any tendency to physical or mental response to special stimulus, and it is a mistake to found human psychology on a row of separate instincts that may be variously combined. What we should emphasize rather is the element of heredity which forms the substructure of all our thought, feeling and action.

Be this as it may, we have in instinct a method which directs sensori-motor adjustment, and by so doing indirectly effects the correlation of trains of action in subservience to vital needs. It is thus the highest form of correlation effected by heredity and co-existent conditions combined, and completes our account of the work of these factors in life.

CHAPTER V

INDIVIDUAL EXPERIENCE AND SOCIAL TRADITION

III. CORRELATION BASED ON EXPERIENCE

So far we have considered correlation dependent on the hereditary structure, or on the operation of present, *i.e.* co-existent conditions. We have now to deal with correlations arising directly or indirectly out of the past experience of the individual, and related to his future, perhaps his remote future, or to that of his society.

(1) *Enduring organic effects.*

Now the influence of past experience in a certain sense affects action at a very early stage. For the reaction of the organism is, of course, dependent on the organic condition at the moment, and this condition will be affected by the past. Thus the animal which has just had a full meal will in general (not always) react to food in a very different way from the animal which is hungry. Again, the animal which has begun to chase a prey has its faculties and impulses directed towards that prey in a special manner, and it may, in consequence, ignore other stimuli for the time while reacting with enhanced keenness to anything proceeding from the chase itself. In such case the past operates, but does not produce any specific types of correlation beyond those already mentioned. Its influence is chiefly interesting as evidence of a certain plasticity in the organism, which prepares the way for higher types.

(2) *Acclimatisation.*

Such plasticity has a more definite effect in the accommodation to special conditions, of which probably all organisms are in some degree capable. This accommodation, which of course is familiar in manifold directions in our own life, is also observable among Protozoa. Paramecium introduced into a weak salt solution will give the 'avoiding reaction,' and repeat it many times, but finally abandon it. If not killed by the new medium, that is to say, the animal becomes acclimatised. The efforts to escape cease, and it resumes its normal life. Often, as we know, acclimatisation will lead us to prefer the accustomed condition to that which originally suited us. In such cases there is a certain correlation based on past experience. But it is to be carefully distinguished from the correlation of actions, *e.g.* of means leading to some end. What it involves is a shifting of the equilibrium point, by which so many acts of the animal are governed. This point is adapted to the conditions under which the individual lives, and with this adaptation a whole attendant series of actions is, of course, modified accordingly. We might speak of acclimatisation as a correlation of the equilibrium point with the persistent conditions given in the experience of the individual.

(3) *Inarticulate Correlation.* (*a*) *Selective Modification.*

The teaching of experience and the development of mind which is stimulated by it, if not founded on it, has as its unit a relation between two data affecting the organism. When we speak of learning by experience, or regard thought as resting on experience, this is the kind of experience that we mean, and when we trace the growth of intelligence, what we have essentially to consider is the way in which the mind apprehends or at lowest is affected by data in their relations, the kind of data that it can apprehend, and the use that it makes of them when grasped.

Probably the earliest form in which such relations affect conduct is one which is amply verified for certain Infusoria.

A stentor gently touched on one side will contract upon its stalk, but will soon open out again. Touched once more, it will perhaps bend to one side, and if continually molested in this manner, it will uproot itself in pardonable dudgeon and swim away. That is to say, it has several ways of reacting to the stimulus and seeking equilibrium, and if one fails it tries another. But now, when it anchors itself again, it seems to have learnt something, for if again touched it does not go through the stages of contracting and of bending aside. It keeps to its more radical remedy, and moves off again. The effect is very transient, but it is there, and is amply verified for Protozoa and for several of the lower Metazoa. Observe that precisely what is learnt is not to avoid some object previously sought, or to seek some object previously indifferent. What is temporarily learnt is to prefer one type-reaction to another —the stronger, the more effective, but also that which the animal is normally least ready to put into action. The given relation—which, if not apprehended by the organism, has somehow affected it—is the failure of response A to remove an annoyance B, or conversely the success of response C in this respect. It need not learn anything about the qualities or relations of B. What has affected it is the success of one of its type-reactions in relation to B. The stimulus B becomes the basis of a different type-reaction from that which it at first called forth. Correlation is effected between a stimulus and a certain type-reaction. Such correlation is observable in human action (though often in combination with higher modes of response) in the acquisition of skill, which is essentially a modification of the means by which a result is attained. We saw that in skill of any kind, though consciousness plays a part, the process of acquisition is in detail unconscious. We can now see that the general method is that of selective correlation. The too violent response lands us in a fall or punishes us with a cut. The insufficient movement ends in a bruise on the other side. If there is no bump or cut, there is at least the disappointment of failure, while the chance response that hits the mark is encouraged by the sudden joy of success. The result is that the successful movements are selected and the failures eliminated. It is reached by a process which we seek in vain to bring within our consciousness. Yet conscious experience has somehow operated to make this accuracy of execution possible. How it operates may be best considered in relation to a somewhat different case.

(*b*) *Assimilation.*

In acquiring skill we perfect the means to an end which is already determined. In the cases now to be considered the end itself is affected. More accurately we learn to redirect our action, to quell a response to which we were originally impelled or to meet with a definite reaction some stimulus to which we were originally indifferent.

Learning of this kind plays an important part among animals as well as among men. It is seen in its simplest form where two sensory data, as A and B, are closely related in time and where one of them is charged with feeling. The relation is particularly clear and simple in its operation where the first datum A is a stimulus setting a hereditary mechanism to work, which has B as its immediate result. Thus, in a familiar observation of Mr. Lloyd Morgan, a chick sees a small bit of orange peel on the ground (A). It pecks at it, and experiences a taste (B) which is apparently unpleasant; for the peel is dropped, and thereafter, or perhaps after one or two more experiments, orange peel is avoided. The pecking impulse is in relation to these objects inhibited. Now, in speaking of an 'unpleasant taste' we are inferring from our own consciousness a feeling in the chick which it may be difficult to verify. But we are not concerned for the moment with the inner character of the process by which correlation is effected in any particular species of animal. It is certain that among ourselves an experienced feeling[1] is the operative element in cases of the kind, and in accordance with the principle laid down above, in describing animal behaviour we use terms involving such consciousness and such only as would be essential with the parallel case among men. In the human mind much higher factors may at any time co-operate, even in the simplest act, while we may have sufficient evidence for denying these factors to the animal. In such a case the evidence of animal behaviour becomes especially valuable as serving definitely to show how far the simpler factors will carry us, and thereby to mark off lower from higher stages of correlation.

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[1] Meaning by the term here and throughout this discussion the entire psycho-physical process in which feeling is involved. The inherent causal efficacy of the psychical is not assumed.

In the case of the chick then we may, on the analogy of the human child which begins to eat something nasty, then relinquishes and subsequently avoids it, impute the change to the experience of an unpleasant feeling. How then are we to describe what has happened? A stimulus A_1, exciting a movement, leads to the unpleasant experience B_1. Henceforward the reaction is modified. Similar stimuli A_2, A_3 no longer prompt to the same motion. Clearly the basis of this change is the relation A-B as experienced in the case A_1-B_1, and one way of explaining the process would be to say that the relation A-B being once apprehended is inferred in any new case where A is found. In this instance this would amount to saying that the chick connected a certain bright yellow appearance in an object with an unpleasant taste, and thus formed a perception, and on the basis of perception an idea of orange peel as yellow, peckable and nasty. There are reasons for denying any such power on the part of the chick which it is not necessary to examine in detail, but which amount to this—that if the chick had such power we should expect him to be capable of many inferences and manipulations of experience of which he is in fact incapable. It is, however, clear that the feeling B_1, which quells the original response A_1, has some lasting effect. In the end this effect is the same as would be produced by an apprehension of the relation A-B. But we do not suppose this apprehension to be formed. The relation then must affect behaviour without being present to consciousness. The response is correlated with its result, but correlated by some less direct method. How are we to understand this correlation? We could only answer this question adequately if we knew how it is that modifications of the mind or of the physical organism are rendered permanent. Confining ourselves to the facts that we know, what we can say is this. The painful or unpleasant experience B_1 tends to quell the reaction to A_1, and the effect persists, in this sense, that in the future similar reactions are more readily quelled till a point comes at which they wholly cease. In fact the whole process may, especially among ourselves, be achieved by a single sharp experience. The psycho-physical tissue is so modified by the wave of inhibition once set up that the original reactive tendency is altogether held in check. It is not, however, the original inhibition which persists. That is a temporary state, which having once occurred is past, like any other event. Nor is it true to say that it is 'revived,' for by degrees, if not at once, the necessity for inhibition disappears, and a new response arises, which avoids the unpleasant object. What comes about then is a permanent modification of the psycho-physical structure, which gives directly the response[1] at first reached only through the reaction of feeling.

Thus the sense-stimulus comes to act as though it were infected or charged with the feeling that is at first a mere consequence of the reaction. And this infection corresponds to something which we actually find in consciousness. The eatable that has a nauseous taste, unless there is a counteracting factor of considerable strength, will come to look nauseous. Its appearance to the eye is 'complicated' with an element of unpleasantness, charged with disagreeable character. When the ground of this unpleasantness is set out it becomes the taste of the thing, which for me, as I merely look at it, is an idea, and an idea distinct from my present perception, but this separation is effected at a higher grade of consciousness. Before any idea distinct from sense perception is formed, the sensori-motor excitement is qualified by feelings which do not originally form part of it, but which come to do so as the result of the antecedent experience of similar sensations and of the attendant response and feeling. Thus on the psychical side the excitement A takes on itself in our consciousness, or ' assimilates ' something of the character of B, and we may infer that on the physical side a corresponding modification occurs.[1] Thus assimilation effects in consciousness the union of a sensory excitement with a feeling originally foreign to it. This feeling determines a response which is in general satisfactory. Hence we may say that through assimilation the elements of an action are correlated with its result. But though this relation is effected by consciousness, it is not itself present as an object to consciousness. It is an underlying fact noted by the observer, but only brought into consciousness at a higher stage. Again, the new adjustment being based on past experience, assimilation may be said to correlate the present with a past situation in the service of the future. The correlation of the successive experiences of the individual is, in fact, precisely the addition made at this stage to correlation by heredity and by co-present conditions. But this relation, again, is not an object of consciousness, for there is as yet no idea of past or future. Thus assimilation is a union of elements in consciousness based on relations that do not enter consciousness, effecting correlations that do not enter consciousness. The modified sensory excitement is the product of a body of experience, stimulus, response, and feeling, acting in a mass. The elements of this mass are not sorted out in consciousness, nor can each be correlated as such with some element of a subsequent experience, as we shall see that it may be at a higher stage. Each acts indirectly as a contributory element in the massed effect, not articulately as a separate datum determining its particular part of the response. We may express this by saying that we have here a massive or inarticulate correlation of successive experiences.

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[1] If the object is simply ignored it may be said that there is no response at all. There must, however, have been a psycho-physical change perfectly comparable to that which brings about a definite movement of avoidance, and the negative result (*e.g.* that the orange peel is *not* eaten) corresponds to that which is 'at first reached only through the reaction of feeling.'

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[1] This has been well brought out by Professor Holmes, 'Pleasure, Pain and the beginning of Intelligence,' *Journal of Neurology and Psychology*, April, 1910.

We may assume that the process involved in the selective correlation of response, as in the acquisition of skill, does not involve more of consciousness or of articulate correlation than this. Probably it involves less. Whether there is a distinction of principle cutting deep into the nature of the organism is not clear to me.[1] But at all events the negative description—Inarticulate—will apply to both, and what is said later of the general effects of this method of correlation may be taken as a rule to cover both cases. Of assimilation proper the simplest case is furnished by such inhibitions of original impulse as have been described. But there are others probably of the same generic type though they are more advanced, and at least in their highest development prepare the transition to a further method. For example, a content A, the sound of a bell, which is originally indifferent, proves to be the beginning of a short continuous train of events culminating in the excitement of dinner (B), and A in consequence becomes by slow or rapid steps charged with the interest of B. By this method the random efforts of an animal may lead to useful habits. It may react to A at first in many vague and useless ways. But one reaction gives B. This reaction, after one or many repetitions, is preferred. All the others get the feeling-tone of failure, one alone gets that of success, and so in time A comes at once to prompt the right reaction. This is the method of Trial and Error, which has been shown to have great importance in the 'learning' of animals.

But among ourselves B need not in all cases be a feeling. Any element entering habitually into the same field of consciousness with A may come to colour A with its own nature. Any data that frequently impinge on one another in our consciousness may become so bound up that to our sense-apprehension one stands for all the rest. Such is the character of perception as distinguished from mere sensation, of Recognition, and of all the operations in which we detect what we call an unconscious inference. This name is inappropriate only if it suggests that there is in consciousness any transition from premise to conclusion. In reality I *see* that wall as a solid object built of brick, though in point of fact I could not by vision alone adequately test its solidity, to say nothing of its composition. But many experiences of touch, resistance and so forth have from infancy been operating upon me in such a way that the apprehension of a red extended surface is filled out automatically with elements that make it into the perception of a wall built of bricks and mortar which I cannot push over or walk through. Logically when I see a little figure running to meet me, and discern it to be my child, I am inferring from a patch of colour quite a fabric of potential conclusions. Psychologically what has happened is that all the meaning that the term 'my child' has for me has got itself incorporated with that vision. The optical sensation is charged with possibilities of meaning, any one of which may be developed into ideas or acts according to the interest of the moment.

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[1] It may be noted that among Protozoa the evidence for selective response is clear, and that for true assimilation very doubtful. Among Coelenterata, however, true cases of the reversal of a response to stimulus are reported. (See Washburn, *The Animal Mind*, p. 214.)

In action the characteristic product of assimilation is Habit. Just as the hereditary structure produces reflex responses to sensory stimuli of a definite type, so assimilation produces reactions which are the same for all stimuli of a class. Correlation of this order does not lend itself readily either to correction or to accurate discrimination of essentially different cases, and where we find habits slowly formed and obstinately adhered to we may refer them to Assimilation. The reason is quite intelligible. The process consists in the modification of the excitement corresponding to A by its assimilation of the character of B. This may take many repetitions to render it permanent, and once permanent it is a structural change which similarly requires much effort to undo. For the same reason the modification easily extends itself to a and α, which to the senses resemble A, but have quite different effects, while it fails to affect A_1, which to a superficial view differs from A, but in reality has substantially the same effect. Habit, in short, like the reflex, is of the nature of a structure built up to suit the simple and the normal, and outside that range failing disastrously.

In the human mind Assimilation is responsible for more than Habit. Past experience operates unconsciously on the highest and most developed as on the most elementary mental products. Our experience in the mass goes to shape our thinking, to suggest one train of thought or exclude another, to determine the way in which we take things. It fuses with the hereditary substratum, and makes of it a new, though more plastic and modifiable, structure, which operates for the most part altogether without self-consciousness. Inarticulate correlation thus operates with elements that arise at higher stages of development than its own, and helps to form the permanent background for our thinking, our purposes, our emotions. But if we wish to understand its action and measure its achievement as such we must strip away all these higher elements. We must reckon only what it adds to the work of reflex and sensori-motor action. So considered, and taking its two specific forms together, its function is to build up the habits and the skill, which form the basis of sensori-motor action, so far as this is not already determined by heredity. The essential new fact which it introduces is that the experience of the individual co-operates with that of the race in determining action. Past and future are correlated, but the correlation is ' massive ' and inarticulate. It is effected by consciousness but not in consciousness, and the result is a structure which yields type-reactions, not a purpose which can adapt action at need to every variation of circumstances which bears upon the end.

(4) *Articulate Correlation—Co-ordination of Concrete Elements.*

Thus far we have supposed the reaction upon a stimulus A to be modified by the effects of the attendant experience B, and have shown how that might happen without any express correlation or co-ordination of A and B. Let us now suppose that this correlation occurs. The individual now has an experience which we may write A-B. It is an experience of two related elements. A is an object to the right of B, or it is an event followed by B. *E.g.* I want my book, I remember that I left it on the table to the right of the door in my bedroom. To get it I have to go indoors, upstairs, and in at the second door on the left. Here there is a quite explicit reference to a set of related elements. These elements in their relations have entered into my experience, and as such form the basis of my present action in which the relation of each step to the end is also explicitly present to me. The correlation of elements falls within consciousness. It does not merely affect consciousness from outside. It is part of the explicit content. In particular the relation of my act to its result is clear to my consciousness. There is in fact a correlation on the one hand of the perceptual data, the space relations of book, table, room, etc., and on the other of practical means and ends, the movements necessary to get the book, and the correlation of practical means and ends is based on the correlation of perceptual data.

In such correlation of means and ends we are said to act intentionally or with purpose, and the end is held in ordinary thought to determine the act. This at once raises the question, how and in what sense can a future event, no matter how near, be conceived as actually going to determine, to cause, the act which brings it about? As to the proximate means common language has its answer. The effect of my act determines me through the idea which I form of it. The idea is a state or act referring to something not as such present, and when I form such an idea and act upon it, I act with purpose, and when I act with purpose I do so either desiring or resolving to obtain the end. We shall see that resolve, so far as it is distinct from desire, involves the elements that constitute desire (and aversion) and more. We may therefore confine ourselves for the present to desire, and define it as an idea of something not yet real, charged with the feeling-tone prompting to such actions as will make it real. Action of this kind therefore involves purpose in the form of desire, and these involve ideas, and as the ideas are of co-ordinated elements, and ideal elements presented in co-ordination form the content of judgments, we may say that the judgment also is involved. As the judgment of the present case is based on or determined by a judgment about the past[1] we must admit that it is inferential, but the inferential process is not as yet necessarily explicit—that is the common elements connecting premise and conclusion do not form distinct contents of consciousness. Indeed the premise itself may fail to be explicit. Without being definitely remembered a past experience may operate unconsciously to supply the relevant idea at the moment of action.[2] Explicit inference is not therefore included among the mental processes necessarily involved.

It will be said that, granted this *prima facie* analysis, it is still absurd to talk of an actual determination of present by future. What has happened is that the course of experience has generated in the individual the state of tension called Desire. There is in this state a mental reference to something future, of a line of action leading up to the effect and blended therewith an impulse to move along this line of action. But though this is a forward-looking state, still it is a presently-existing state which has grown up out of the past, and by its present character determines future phases. It is not determined by them, because what now is cannot be determined by relation to what will be. We shall discuss this matter more fully at a later stage, and shall allow ourselves in the meantime to stand by the ordinary way of thought which speaks of a purposive act as determined by its ends. We have only to note that the end is also determined by the purposive act, and that there is therefore a true mutual correlation of act and end.

This brings us to a further question, how do we distinguish correlation of this kind from the unconscious correlation of the previous stage? Where we have to judge by external behaviour only the distinction is by no means easy to make, and involves some of the most difficult questions of comparative psychology. Thus we ordinarily conceive a dog as begging in order to get food, *i.e.* intelligently, purposively. But suppose it is suggested that previous experiences of the begging posture and attendant gratifications have bred up in the dog the habit of begging when hungry? Suppose, that is to say, that the apparently intelligent performance is taken as a case of unconscious correlation. How are we to meet the suggestion? How do we distinguish between the indirect effects of related experiences on the reaction to stimulus, and the direct effects of a correlation established within consciousness? The reply is that among human beings the distinction is made clear in the first place by careful attention to the contents that come before consciousness, and in the second place by the nature of the action involved. It is the difference, for example, between my perception of the wall in which, as we have seen, the experiences of solidity, etc., qualify the actual content of vision, and the explicit judgment 'That is a brick wall'—not a painted or reflected wall which to mere vision might equally possess the 'solid' character. It is the difference between the emotion of fear which a thunderclap may produce and the explicit judgment that in a moment we may be struck dead. In action the differences are still more marked. The habits bred by unconscious correlation are habits of type-reaction to type-stimuli. True, as we have seen, these reactions may be graded and refined in detail to meet the variation of individual cases. But all these cases fall under a type, which as a type produces a generic form of motor reaction and attendant feeling. Now in the search for my book there is nothing of this. The need of a book in general or of that particular book does not discharge in me the set of motions that take me from wherever I happen to be to my bedroom. The whole case is unique, and its uniqueness depends on the particular concrete relations of the book which fall within my explicit memory or at any rate within explicit past experience. What we achieve at the present stage then is the appreciation of the different relations in which things stand to one another, even though these relations are not present to perception, together with the power of so using them as to gain our ends. The concrete circumstances in which any living being is placed are always varying. Any element in its surroundings stands in many relations, and any one of these relations, seen or unseen, near or remote, may in fact be relevant to the life and purposes of the individual. It may be on the whole better for the individual that it should acquire a stereotyped method of reacting to a certain element than that it should act purely at random. But it is better still that it should be able to vary its actions according to the relations in which that element stands, and this it is able to do by the conscious recognition of those relations.

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[1] I mean, *e.g.* that my belief that the book is in my room is based on the remembrance that I left it there.

[2] The fact that I left the book may operate in consciousness to engender the anticipation, 'I shall find the book there,' rather than the memory-judgment, 'I left it there this morning.' It must be admitted that in the human mind the one judgment passes into the other, but at a less reflective level it may be otherwise. See below, p. 84 and note.

The conditions of such variation are in the main two. First, the mind must be able to appreciate distinct elements in relation. A and B must not fuse or be assimilated. They must remain distinct and yet be related. Thus the sound of the bell must not merely be charged with the suggestion of dinner. It must remain a clearly-cut content on which dinner as another clear-cut content follows in time sequence. But secondly, the sequence once apprehended must somehow serve as a guide to action. At lowest this involves that where 'A,' say, is present as an object there is an effort to institute the sequence AB. But B is not here something present. It is not an object to the senses. If there is true conscious effort to bring it about there is a conscious state involving direction or reference to something not present. Such a reference generically is an idea. The emergence of ideas is a fundamental departure in the life of mind. Hitherto we have considered consciousness as concerned with objects present or given to it—expressions which we may paraphrase, but which we have not succeeded in analysing further. The mind is either merely aware of what is given or reacts upon it, seeking to enjoy it and maintain it, or to escape from it, be rid of it. These are modes of conation, the first of which is barely distinguishable from the feeling of pleasure, while the second is evidenced in a series of definite efforts or conations. Now with the emergence of ideas we get an explicit reference to something which is not present at all, and which serves from the outset to direct conation to the production of something that is not yet, but can be definitely anticipated. How does this transition effect itself?

Let us note in the first place that in perception we have a mental act which may be said to occupy an intermediate position. For perception is essentially a judgment asserting something given. Yet its assertion contains somehow more than is given, for the perceptual judgment may be wholly or partially false, whereas what is given *qua* given is simply fact. Perception may be said generally to assert something given as having its existence in some definite spatial relation, and it is in regard to this spatial relation that error may arise, for instance, in any case of illusion. This reference effected by perception arises from the action of the given on a mind possessing (1) certain definite tendencies to correlate its experiences in certain ways, and (2) a certain antecedent experience which it brings to bear on the present from moment to moment. Since the experience is incomplete and the tendencies imperfect as agencies of absolute truth the perceptual judgment may be in varying degrees inaccurate or false. Perception then is not a mere acceptance or awareness of what is given, but an interpretation of the given which refers it to a definite position in space and time. Nevertheless perception is a judgment about the given, and thus falls on that side of the line of which we have already taken account, whereas any explicit reference to that which is not given falls on the other side within the world of ideas and ideal-judgments. We have thus to ask how ideas may be conceived as emerging in a mind which is at first concerned with the given.

The idea is not, as the early empiricists supposed, simply a faint revival of the past experience, for it is unlike the experience which it is supposed to copy. The image which may arise in my mind now of a place which I saw last year might be explained as such a revival. But my memory judgment, 'I was there last year about this time,' is an act of quite different character from the perceptions which I experienced last year. It is an act of reference to them or to their objects as something belonging to my past. Similarly, an anticipation which guides my efforts is an act of reference to a possible future. 'Revival' alone will not explain the genesis of this type of reference, but revival operating on other mental elements may help us. The general history of mental development suggests our looking for such an element on the side of conation. We may pretty confidently assume that ideas first arise as subsidiary to conation and as directing it. Now we have seen conation in its earliest forms as a spasmodic activity excited by discomfort and continuing till the discomfort is removed. But in the most developed forms of sensori-motor action we have already reached a more definite species of effort than this. Particularly as the 'distance receptors,' *i.e.* the senses of sight, hearing and smell, evolve, we have action directed definitely *to* certain distant objects. Such effort again we have seen will be confirmed by an agreeable experience, and in this we have a form of 'revival.' The general character of this revival is that a conation involving perhaps an ordered series of actions may be set going by a stimulus which has previously been a starting point of a successful effort, *i.e.* one that has had agreeable results. Now let us suppose revival to operate on a mind capable of perceiving three objects A, B, C in definite space and time relations, C being something desirable, *e.g.* food. If the three objects are present to the senses, the first two leading up to the third (*e.g.* as intervening objects in space), conation will be definitely directed to C *via* A and B. Let this have happened and then let A alone be given. If the animal is hungry, *i.e.* if there is a conational basis to go upon, A will, according to the law of revival, excite a conation corresponding to the previous one, but this was a conation definitely directed to B and C in succession as things standing in a definite relation to A. The animal then directs its motions to the points where, in accordance with the first experience, B and C should be, *i.e.* 'it looks for them.' Again if B is some change which brings C about, it sets itself to perform B and so obtain C. Its action is directed to something not given, and this appears to be the germ of a conational or practical idea. The further step required is the disengagement of the idea on the one hand from the direct conational interest on the other from the order of past experience. This may be conceived as arising from the circumstance that any desired object will stand in relation with many different things, one of which will be relevant in one case and another in another. Without pursuing this development here we may conclude that the first emergence of an idea consists in the definite direction of effort to something not given, and arises from the joint operation of three conditions, articulate perception, directed conation, and the power of a stimulus to 'revive' a defined effort.

Whatever the precise genesis of the new process, what has come about is an effort consciously directed to something absent, a mental state of a new kind which is apparently due to an effect of a past perceived relation impinging on a present conation and so defining it. In the full development of this form of correlation such effort involves an anticipation.[1] But if we are to so describe it we must bear in mind that the anticipatory state has its feeling-tone tending to set up the action suited to it. The effect of the development will be that action is now pivoted, not as before on A, but on C itself, and may be varied in accordance with any of the relations in which I stand at the moment and which experience suggests as likely to affect C.

Whether correlation of this order is attained by the most intelligent animals is an open question. The affirmative view might be proved if we could show one of three things, viz. (1) that animals can learn from witnessing the sequence of events or the relations of objects, and not merely by the modification of their own action by attendant feelings. *E.g.* if a dog sees a bolt pulled and a door opened disclosing food within and then comes to pull the bolt himself, the inference is that he has correlated a little series of events. Experiments on these lines give very varied results, and the interpretations of experimentalists differ. The question cannot be regarded as settled, but upon the whole the evidence shows that such 'learning' is exceptional, but that it does occur among apes and monkeys and probably among some other mammals.[1] (2) That animals vary their action according to the individual circumstances of the case—the relations in which they stand. Thus a dog has been scolded or punished for lying on the sofa with his dirty paws. He avoids it in the presence of his master, but indulges in his absence, and pays no regard perhaps to the presence of some more easy-going member of the family. Mere habit, it may be argued, would have induced avoidance of the sofa, or perhaps of the person who struck him, and for reasons of this kind a less intelligent animal is incapable of instruction unless of the most rudimentary kind. A dog is afraid neither of the sofa nor of his master nor even of the stick, but only of a certain expressive combination of the three. It is of course possible to suggest that the dog learns by habituation to respond to that particular combination, but the explanation wears very thin when it has to be extended to account for every difference which an intelligent dog will make in dealing with different people and different things. The essence of the correlation with which we are dealing is that it guides action in any situation by reference to its special relation to the object desired, and if an animal can vary its action in accordance with such special relations, not once or twice as by happy accident, but as a regular part of its behaviour, it must be taken to have advanced beyond the stage of learning by mere habituation. (3) Evidence of conscious correlation may be derived from cases in which an animal performs a novel action as the result of relations which it has experienced. *E.g.* in a well-known story a dog chases a rabbit which bolts for a drain; next day seeing the rabbit again it makes straight for the drain. Here there are no materials for habituation to work on. It is the perceived relation that operates. A few carefully studied instances of this sort would put the matter beyond dispute, but unfortunately evidence of the kind is from the nature of the case anecdotal, and it is not only untrustworthy in its detail but entirely lacking in study of the previous conditions, which would very often put the incident in a different light.

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[1] It cannot be too emphatically stated that an idea at this stage is not a general idea. It is a reference to something to come, that is, something particular. It may in the full development of this form of correlation also be a reference to a particular event in the past, but I have no doubt that Miss Washburn (*The Animal Mind*, p. 274) is right in contending that the first function of ideas is to guide conation, that is anticipatory. We might call such ideas Images, but that involves a description of their character which is not always easy to verify and is not necessary to the bare statement of their function. That function is direction, or, as I call it, in order to bring out the generic community with other ideas, reference.

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[1] For monkeys, see 'Imitation in Monkeys,' by M. E. Haggerty, *Journal of Comparative Neurology and Psychology* (July, 1909); 'Some Mental Processes of the Rhesus Monkey,' by William T. Shepherd (*Psychological Monographs*, Nov., 1910). For cats, 'An Experimental Study of Imitation in Cats,' by C. S. Berry (*J.C.N. and Ps.*, 1908). For Raccoons, 'Concerning the Intelligence of Raccoons,' by L. W. Cole (ed. 1907) cited in 'Animal Behaviour,' by H. S. Jennings (*American Naturalist*, March, 1908). I have not seen Mr. Cole's article, but have to thank the other writers mentioned for their monographs. Mr. Jennings in the same paper quotes from Mr. G. van T. Hamilton an experiment showing what appears as a high development of this method in a dog. But again I have not seen the original.

It must then be admitted that the question whether the animal mind reaches the stage of conscious correlation remains unsettled.[1] In my own view the probabilities favour the affirmative answer,[2] and I shall provisionally assume that this stage in mental evolution is reached before the birth of the human race. There is the more reason for this view in that language, the distinctive characteristic of humanity, the necessary instrument of human thought, the basis of the social mind, is not essential to the correlation of perceptual elements or of the practical means to near and concrete ends. Be this as it may, we have in any case a further stage in the development of Mind to be noted. Its distinctive feature is that a relation such as A-B which before only affected our attitude to A now enters into consciousness. We can apprehend terms in their relations and therewith any one term in many relations. On the basis of this articulate experience we form anticipations and ideal constructions, and so far as any of these are imbued with feeling-tone we conceive desires and aversions, and shape our action thereby, *i.e.* we act with purpose. Articulate perception, idea and desire thus go together as the characteristics of this stage. We have in consciousness a direct correlation of distinct elements of perception on the one hand, and of means and ends on the other. Action is no longer, as in the previous stage, correlated indirectly with its result, but directly aimed at it. Nor is it based on the massed experience of the past alone, but may be correlated detail for detail with the relations of objects as they have been given in perception. We are always dealing with the perceptual surroundings or with the object of desire, and the ideal links between it and the percept of the moment.[1] But in either case we have distinct elements articulately related to one another. If we conceive such correlation repeated continually without any advance beyond this plane of mental activity we shall have a ramifying co-ordination of the objects and events which make up the perceptual world of the individual, serving from time to time as a basis for the satisfaction of his desires. This world will not be present to consciousness as a system, but any part of it may operate within consciousness when it is relevant to a momentary need, and we must observe that although the objects before consciousness at each moment are particular objects

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[1] The recent work of Professor Köhler provides strong affirmative evidence in the case of chimpanzees. The question that remains open is how far down this method of correlation is to be carried.

[2] Whether if animals do attain this method of correlation they employ the same mechanism as the human mind, *i.e.* particular or 'practical' ideas, is a further question, far harder to determine. We cannot look into the animal mind, we can only ascertain at best whether its behaviour involves a function corresponding point for point with one of our own. But the precise nature of that which passes in the animal consciousness is for my purpose of much less importance than the kind of correlation which it achieves.

[1] In the human mind there may be distinct reference to the past at this stage (*i.e.* without involving general ideas). That is there are true memory judgments as well as anticipations. To verify such memory judgments as distinct from efforts based on anticipation guided by past experiences seems impossible if our evidence rests on external behaviour alone. True memory as distinct from anticipatory ideas cannot therefore be securely attributed to animals.

what is relevant in the guidance of action is that which is common to the existing situation and to others that are already familiar. We have a correlation of particulars based on common elements. This correlation may be called Direct (or conscious) and Articulate.

(5) *Correlation of Universals—Analysis and Synthesis.*

The inference from the past to the present or the future is founded on a certain community of character which unites them, and it becomes explicit, and so far rational, in proportion as this element rises into consciousness and is recognised as the basis of our proceedings. From the look of things I think a thunderstorm is coming on. This is an expectation based, let us say, on my own observations of the weather, in particular it may be of yesterday's weather. I may not think about the basis of the matter. I may be concerned merely with the present and I put off my walk. But if a discussion ensues I begin to analyse, I point to those clouds, remark on the heat, consider the direction of the wind and (to take the matter in a very simple form) point to the correspondence in all these details with the situation of yesterday. This is to dissect the situation as perception gives it me, to find elements common to it and to a previous situation, and to make these common elements an explicit ground for inferring a further point of resemblance. There are here the essentials of the reasoning process, the bare elements of which may be succinctly characterised. The data of perception are resolved into distinct elements of character recognised as qualifying experience (analysis), and such elements can be combined to form new wholes without any reference to the order in which they are perceived (synthesis).[1] Hence are formed thought constructions or concepts which take us altogether beyond the world of perception. Whither they take us, whether to a region of pure imagination or to a deeper reality than that of perceptual experience depends on the way in which they are formed. In this process the structure of the mind as shaped indirectly by racial and more directly by personal experience is necessarily the determining force, but at the outset it operates unconsciously. Inasmuch as it has been formed under the conditions governing survival, it tends in the main so to construct our thought-world as to facilitate and improve our dealings with reality. But this is only to secure a very rough and general correspondence, and how far thought actually yields truth remains a question, which is only to be solved by bringing its data, methods and results into conscious correlation. This is the work of a higher phase of development of which we shall speak presently.

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[1] It should be understood that analysis and synthesis are not two separate processes, but rather distinguishable phases of what is essentially a single process of correlation. Where one is explicit the other will be found to be implied. Thus, what is consciously a comparison, and so a synthesis of two objects, rests on an analysis, and conversely.

Meanwhile we must note certain points bearing on the evolution of the thought-world. In the first place, we must remark that from the beginning of this phase we are really passing out of the development of the individual mind strictly considered. It is of course conceivable that the process of analysis and synthesis might arise in the mind of an isolated individual, but as we know it, it is the product of communication between mind and mind, resting on and in turn facilitating the development of language. For the name of common significance involves analysis, and the significant sentence is a synthesis of elements which analysis has rendered distinct. To give a thing a name which will be understood is to select in it a character common to it and to other objects within the experience of the speaker and the hearer,[1] and to say anything intelligible about a thing is to render a combination of elements in idea, which combination the words must be able to reproduce in the hearer's mind unaided by perception. Thus analyses and syntheses of perceptual experience are the basis of language, while conversely they can never go far in advance of language.

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[1] A proper name may seem to be an exception, but is not. The individual is a continuous being running through my experience, recurrent in many of my experiences and common to them, and also, if the name signifies anything to you, common to you and me.

The meanings which we cannot somehow express we not only fail to propagate among others, we lose them ourselves, they are fleeting impressions, lights and shadows of reality which we cannot fix and unwillingly let go. Language then—or more generally the social means of expression—forms a kind of sieve catching the expressible and letting go those elements of experience which it cannot render. The degree of adequacy with which it can express meanings is accordingly of the first importance in the development of human thought.

The common elements which we find in experience and which serve as a basis of interconnection between its parts fall generally into two categories. There is in the first place community of character, or Resemblance, which lies at the basis of all generalisation. The resemblance may be loose and vague or it may be precise, and the advance of exact thought consists on one side in analysing loose and vague similarity into elements of exact resemblance and definite difference, concepts, or concept-elements which are the true units of science. As such elements become distinct we arrive at propositions which are true of them as such, and thus reach the explicit conception of the universal and the necessary. These relations are shot through the varying movement of our experience connecting things most remote in space and time by underlying affinity of character, and so we may think of this form of correlation as a ' cross-correlation ' in that it cuts across the order in which experience comes to us. Regarded as a method of dealing with that experience, what it enables us to do is to grasp it in masses, grouped by affinity of character and consequent necessity of interrelation. It forms our world into Classes of which we can take a comprehensive view, by reference to which we can judge new cases, and with the aid of which we form general rules of action.

In the second place, the basis of interconnection may be continuity of existence, *i.e.* the continuity of an individual passing through various phases or presenting numerous qualities in simultaneity and succession. Here again the concept is a basis of correlation between an indefinitely great number of concrete elements of experience, and when it is brought to bear upon action serves to correlate the act of the moment with permanent interests and general principles. By its means the individual consciousness grasps the continuity running through its experience and projects it into the future. It becomes conscious of Self—for the self, as remarked above, is the element of continuity running through the acts of consciousness—and at the same time and by the same methods aware of other persons and of the social groupings which they form. It can focus its own experience in generalisations, and learn and teach others by communication. Henceforth a social tradition comes into play, the past history of society acquires a significance, and action may be guided by a conception of the social future. Lastly, on the practical side these larger interests appeal to the self as a whole and often conflict with the solicitation of some more special and immediate end. In that case they prevail only when they can obtain a response from some dominating central impulse of the self wherein the desires are either harmonised or controlled. This central impulse is what we call the Will, and it is influenced by the relatively persistent feeling-tone of the self as desire is influenced by the temporary feeling attending its realisation. This relatively persistent feeling-tone is the backbone of Happiness and Unhappiness, or at least of internal Peace or internal Discontent.

Thus along with the concept and the processes of explicit reasoning which centre upon the concept there emerges the knowledge of self, and of other beings as persons, the formation of a social tradition, and that organisation of impulse that we know as will. Any one of these involves the rest and is distinctive of the human as opposed to the animal grade of development.

The world as conceived under these influences soon begins to be a very different world from that which is perceived. It is a world not of colours and tones and feelings, but of persons and things, groups and classes, quantities, qualities and relations, the stable fabric prolonged indefinitely into past and future, whose states, phases, attributes, changes make up the world of perception. To the higher development of mind there corresponds a deeper stratum of reality. As at the stage of Assimilation Reality may be conceived as presenting itself in the form of sense-stimuli charged with feeling, and as at the stage of perceptual correlation it appears as a network of related objects of perception underlying and in a measure explaining the stimuli and their attendant feeling, so now it appears as a world of permanence in the midst of change, of uniformity shot through variety which is again to explain the perceptual order. Each advance of intelligence may be taken, on the one hand, as extending our grasp on experience, and consequently our power to direct life, on the other as yielding deeper insight into new orders of reality. The building up of the conceptual order however is a long and gradual process. It is essentially an achievement of what is sometimes called the social mind; that is to say of the minds of men in continuous interaction throughout the generations, and the stages of its formation are in a measure recoverable from the examination of the actual movement of human thought. We shall find at least enough material to indicate some of the leading phases in the evolution, and we shall review this material in the next chapters. We shall there see clearly enough that the 'self-consciousness' of the human mind is by no means the same thing as self-criticism. In all its earlier phases the operations of the mind, however clearly it be aware of its immediate object, are set in a framework which is built up by the joint action of social tradition and the hereditary structure of mind. When criticism is turned upon this framework a higher stage is reached.

The phase at present before us then may be characterised in general terms as that of the correlation of the common elements—universals—which run through the perceptual order. It arises as these universals, which previously operate unconsciously, emerge into explicit objects of consciousness, and are thus capable of correlation. With their aid it arranges masses of experience in ordered groupings and forms general rules for the guidance of action. If, as before, we conceive it to advance upon its own plane without leaving it, if we put together all that may be effected by consciousness without necessarily constituting a unitary object of consciousness, we may say that it will effect a comprehensive order co-ordinating the general relations found in experience with permanent elements of well-being, and the experience would be social as well as personal experience, and the well-being social as well as personal well-being. But still, upon this plane, however far-reaching the order may be, the methods of correlation are determined by massive forces reaching far into the background of social tradition and racial heredity. When the work of correlation has advanced to a certain point the existence of these forces emerges into consciousness and provokes questions which give a new direction to effort. This effort initiates a higher phase of mental activity. The characteristic work of the stage now described is a Correlation of Universals based on the conditions of racial and social development which are not yet brought into consciousness.

(6) *Correlation of Governing Principles.*

Of some further characteristics of this stage and of the steps by which it is reached, more will have to be said in the next chapter; but it will be well first to complete our summary account by a brief preliminary indication of the next step which is the last we shall have to take into account. It might seem that on the lines just indicated thought could advance indefinitely towards a comprehensive view of experience and even of reality as a whole. But in point of fact the work of thought in the stage hitherto considered is broken and incomplete. Experience is gathered up into masses presenting some internal order, but not yet harmonised one with another. Our common knowledge is broken knowledge and half knowledge, a series of glimpses with no complete vision. In close correspondence our purposes are fragmentary and inconsistent, and we war both with ourselves and with one another. The roots of this discord can be traced to the conditions of development, and in following the movement of human thought we shall see how inevitably they result from the uncritical reactions of its structure to the promptings of its experience. Conversely, the method of advance towards genuine unity lies alike on the side of knowledge and of action through a process of reconstruction. This reconstruction, the general character of which will be discussed in Chapter VIII., will be found to depend, once again, on a fresh turn of the mind by which that which has hitherto operated on consciousness becomes an object of consciousness. In this case the factor in question is nothing less than the correlating activity itself, the structure of the mind, the entirety of the data and the processes by which and out of which the mind evolves its percepts, its thoughts and its purposes. The nature, the growth, the potentialities of mind itself form the keystone of the complete synthesis at which reconstruction aims.

And as at former stages so here, the new turn of thought brings us into contact with a deeper stratum of reality. As we passed from a 'world' of sensory stimulus and feeling to one of related objects and events, and from the network of percepts to the elements of common character and persistent identity running through it, so now in the critical reconstruction of knowledge we are dealing throughout with a new view of reality—the underlying forces, be they spiritual or mechanical, which are grasped indeed by means of perception and thought, but only when perceptions and thoughts are critically compared and systematically interrelated.

The distinguishing feature of this stage is the explicit recognition of the conditions operating on or in the mind itself, the entrance among the data to be correlated of the correlating processes or activities. It is a self-conscious correlation, a correlation of methods and results, or, briefly, of ultimate principles. If, once again, we conceive this critical movement carried through it would analyse our mental world down to its elements, and our purposes to the ultimate sources of their value, and it would bring them together into a working whole of rational comprehension and purposive activity. It would correlate the system of racial experience with the ultimate ends of racial development. It would thus cover the entire sphere of human life, bringing its past and future within the compass of a single synthesis. This would, in the first place, be effected by consciousness piecemeal, but in its completeness it would also come within the scope of reference of consciousness. The development of mind would come within the knowledge of mind, and it may be inferred in some degree within the control of mind.

With regard to the measure of this control more will have to be said. But we have first to justify our summary account of the two last phases here distinguished. This will be the task of the remaining chapters of this part. We have to begin with the building up of a partial and uncritical order of thought by mind in human intercourse. This will occupy the following chapter. We have then to deal with the work of reconstruction, which in its various phases will occupy Chapters VII. to X. Here we have briefly indicated the nature of these phases in order to take a summary view of the movement of mind as a whole. The latest phase as thus summarily described completes, it will be seen, that process of correlation which we have traced from its beginnings by bringing within the circle of consciousness all the factors that work upon consciousness. Throughout the development there has been stage by stage a change of orientation, engendered by the entry into the field of conscious intelligence of something that before affected the mind without entering in as an object, determined correlation without being itself a term in correlation. This series of changes would seem to be completed in idea by the inclusion of the conditions on which its own existence depends. We are now, therefore, in a position to take a summary view of the succession of phases in the evolution of Mind.

We have been led then to conceive of life as the process of a psycho-physical structure which grows up in interaction with the environment and which acquires, through the medium of correlations of which consciousness is the essential organ, the power of directing its own fortunes. In the lowest stages consciousness is undeveloped, and the response to the environment, at first wholly random and useless, is gradually directed in paths which are normally suitable to vital needs by the action of heredity. This is the stage of the 'Structural' action and the hereditary reflex, which controls the immediate response to direct sense-stimuli. So far correlation is based on the hereditary structure. To meet the individual variations of such stimuli a special correlation of co-present sense-data is required, and this is the first work of consciousness in sensori-motor action. The feeling-tone determining this correlation from moment to moment may be so adjusted, through the influence of heredity, as to guide trains of action towards ends of vital service. Such a train of action is called an Instinct. Correlation based on heredity is here combined with correlation based on present conditions. From this we pass to correlation based on Individual and Social experience. This yields first the formation of habit and trained skill resting on the correlation of sense-stimulus with feeling under the influence of related consequences. There is a massive, indirect and inarticulate correlation of individual experiences. In the next stages these consequences come into consciousness, distinct elements are grasped in their relations and anticipatory ideas are formed on the basis of perception under the influence of underlying affinities. Particular experiences are articulately or directly correlated. Next, these affinities come into consciousness and we have a Correlation of Universals,—in which experience is organised into bodies of thought and action subordinated to wide and permanent ends, while both the experience and the purpose are not merely personal but also social. Lastly, the deficiencies and contradictions of the thought-order force on a process of reconstruction by which the underlying factors of heredity, of personal experience, and of social growth which go to the building of consciousness, are themselves brought within consciousness. There is a correlation of results with processes or principles. With the aid of these principles it becomes possible to take a comprehensive survey of human development, tracing our life backward to its ultimate conditions, and carrying its aims and efforts forwards to their ultimate meaning and goal, to correlate human purpose as a whole with the conditions of development as a whole.

CHAPTER VI

THE EMPIRICAL ORDER

In the development summarised in the last chapter the two final stages were treated as the work not of one mind but of many. From the dawn of language onwards the action of mind on mind is the leading factor in development, and henceforward every phase of thought may be regarded as a social product and as a cause of further social effects. Our next task is to describe these latter stages in some further detail, to examine the steps by which in human society the thought-order is evolved, criticised and reconstructed. As before we shall find that every phase has its distinct method and its peculiar scope. It brings us into contact with a new stratum of reality in virtue of a new method of correlating experience, and it enlarges and clarifies human purposes in the same ratio. Our object then will be to distinguish the main phases of development experienced by the human mind in point of the characteristic methods used, and the scope of thought and purpose achieved. We shall find that particularly in the later stages a third question arises, that of the ultimate validity of the processes employed and the results attained. This question carries us outside our immediate task of recording the simple facts of the development of thought, but we shall find it so closely interwoven with the questions of scope and method that it will be impossible to eliminate it from the discussion. We shall, moreover, as explained in Chapter I., have to form a definite conclusion upon questions of validity in order to reach a just interpretation of the meaning and trend of development as a whole.

The movement has many aspects and, though at bottom a unity, its essence can only be intelligibly explained by following each aspect separately. We shall deal with it first on the side of thought or cognition as such, then on the side of purpose, and lastly on the side of those social relations in which thought and purpose may be said to be embodied. In each case we shall follow the process as a whole from the evolution of general ideas to their critical reconstruction.

(1) *The Empirical Order.*

We have taken language as the distinctive mark of human intelligence because it reflects the conceptions by which empirical data are brought into relation. It not only reflects them, it is the condition of their effective use. Resemblances of quality are expressed by general terms, continuity of existence by individual names, the relation of ideas and the order of connection in thought by the arrangement of words in the sentence. As the work of correlation is mainly social it cannot proceed effectively unless by means of expression, and the expression which is in the first instance an effect thus becomes in substance a most important determining condition of the further development of thought. Language and its early accompaniment, gesture, form along with art the two principal vehicles of expression, and if we had a complete record of language and of art, we might reconstruct with fair completeness the earlier stages of the growth of the human mind. This, as the evidence stands, we cannot do, but we are able to distinguish certain phases of growth sufficiently to see that the general ideas which form our ordinary mental furniture have a history, that the process of forming them is one that only came to maturity by degrees, and that it reaches maturity only to give occasion for the higher processes of 'Reconstruction.'

Let us begin by considering the character of the process as a whole. As the work of correlation advances a certain order emerges within the chaos of perception. This order does not in its earlier stages amount to a system, still less is its formation guided by conscious and deliberate method. We are to conceive the great forces of the human mind as still operating from the background in the dark. The light of consciousness falls, as it were, on the surface of a deep sea of energy. It stirs forces that reach far down into the depths, and these forces determine the movements and rearrangements within the lighted area, but without themselves emerging into the light. Ideas are formed, names are given, judgments are passed, inferences drawn, emotions stirred, desires conceived and plans of action resolved upon, and the whole play is played out on the illuminated area. Perception gives the cue, deliberate action supervenes, and further perceptible results follow, but to trace the real causes to their roots we should have to go below to forces which are not formulated and are perhaps but obscurely felt. Nevertheless as the work of correlation advances, certain governing relations begin to stand out. Without being recognised as explicit principles of correlation, without even being named and known on their own account, they do in fact function as structural forms of great generality which come to govern the work of correlation, give shape to the entire order, and direct the work of construction. These structural forms are what are known later as the categories, and become definite concepts, such as those of substance and attribute, cause and effect, space and time, action and passivity, persistence and change, sameness and difference. In the stage of common sense proper they are not distinct concepts, but words and grammatical forms expressive of modes of thought which correspond to them are in full vigour[1] and it is from these that they are educed by reflective analysis. We may therefore speak of them as categories of common sense. Now these categories, while themselves educed from experience, react powerfully—and that long before they are named and known for what they are—on the empirical order. To understand this action it is not necessary to suppose, after the fashion of the Transcendental Analytic, that nothing could be experienced that does not conform to certain pre-existing categories. It is sufficient that whatever when experienced falls within the limits of one or other of them acquires thereby a certain local habitation within the existing order. What will not square with them is vague, meaningless and obscure. It hovers doubtful on the confines of consciousness. It cannot get itself expressed, nor enter into the ever-living medium of language, which alone confers permanence on the fleeting experiences of man, and so it flutters away again from the ordered world into the darkness of the inane. The victory of the categories is not established without a struggle, and like other victories it ends in a dictatorship under which death or exile is the penalty of recalcitrance.

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[1] And possibly at an advanced stage they actually take shape as general ideas. See below, pages 98 and 105.

The empirical order thus established on the solid foundation of the categories constitutes what we know as the world of common sense. The term empirical must not be taken to mean that the order consists simply of the series of sensations, emotions, or, generally, of the contents of immediate consciousness. Precisely because it is an order it is more, and also less, than these. It is the world built up out of these by unreflective processes of thought, imagination, feeling, action. It is the world of which men can give some account to themselves and one another. There is in it something of system, for the general ideas which it forms and employs serve to connect experiences and to direct actions. But it is an unsystematic system, for the principles of connection are never sought out beyond the point to which practical needs or casual interest may lead, while the processes involved in establishing the order, though processes of thought, are, as has been said, unreflective processes, that is to say their nature and implications are not examined. Nevertheless, though its conceptions are loose, its generalisations somewhat slippery and its methods uncritical, common sense does by slow degrees evolve a kind of order. We may even say that without deserting its own plane it evolves a generalised order—the natural course of things—Nature, human, non-human, animate and inanimate as we know it in experience, and this order in fact governs our ordinary workaday life. It is this nature and the loosely woven tissue of rules, ideas, views and practices that constitute it that I speak of here as the Empirical Order.

(2) The formation of this Empirical Order forms the first phase in the development of human thought. Its critical reconstruction occupies the second phase—the two corresponding to the two highest phases in the general evolution of mind sketched in the last chapter. But both movements break up into subordinate steps, which we proceed to distinguish.

The lower phase that precedes the consolidation of a common sense order is best understood by reviewing briefly the character of the looser and lower modes of the exercise of intelligence in the developed man. For the more primitive ways are never laid aside. They are merely overlaid and held in check by the more developed thought which is the distinctive product of cumulative social influences. If we suppose this influence withdrawn, we obtain some measure of the untutored mind of the child and of primitive man, and we can in fact corroborate our deductions by the direct examination of ideas and methods current in the lower culture. It will be sufficient here to distinguish two points in which the lower order of thought falls short of the methods and achievement of common sense.

(*a*) Common sense uses, in the organisation of experience, general ideas—man, animal, custom, good, evil, round, square, single, plural, which are in the main clear and distinct without being rigorously defined or systematically compared. They serve their own purpose, which is that of colligating experience, grouping together things which belong together, and focussing results for the guidance of practice. For these purposes the rough-hewn idea serves its turn. The ' round ' is not Euclid's circle. It is a wheel which turns ' true ' enough to make the cart go. The ' just ' man is not one who conforms to an abstract ideal of fair dealing, but he is one whom his neighbours trust. Ideas at this stage serve to focus masses of experience, but are not themselves so clean cut and defined as to be capable of being built into a regular system. Where such systematisation of accurate thought-elements begins we are passing beyond the sphere of common sense into that of science. The common-sense concept is made what it is by rough and ready working of experience, which forces comparisons and distinctions, and so engenders enough of accuracy for many practical purposes, but not enough for systematic reasoning. We may call the concept in this stage a general idea. At the full height of their development such ideas though not defined are clear, and except for a certain raggedness about the edges, distinct from one another. Each embodies and expresses a certain mass of experience and that only. The achievement of such ideas represents a distinct onward stage in human thought, for one of the first points that we discern in the lower strata of the mind is the relative absence of such distinctness. But we must carry the matter a little further. Obscurity and clarity are relative terms. Throughout the history of thought new distinctions are constantly being drawn, and what appeared clear and definite is shown to have concealed ambiguities and obscurities. Thought does not rise out of the mists once and for all. What then are the kind of obscurities that beset childish and primitive thought? The answer may be found by returning to the categories of common sense. For common sense this is a world of substantial things possessing attributes, entering into relations with one another, acting causally on one another so as to produce changes which are events occurring in time and space, and so forth. Common sense does not qualify these varying aspects of reality in abstract terms. When it does so it begins to be metaphysics or science, but its concepts do follow the lines of distinction prescribed by these several sides or aspects of experience, and in its maturity it does not confuse the sphere of one category with that of another. Its substances are substances and its relations are relations. The characteristic of earlier formless thought is that it does make confusions of this kind and in particular it confounds the category of substance with the others. Thus the vital functions of men, animals or plants become a quasi-material essence, identified perhaps with the shadow, perhaps with the breath, capable of being caught, confined and transferred. A word or a thought may be a living force, and if charged with emotion like a curse, may be washed off a person or purged out of him. A pain is a stone that may be extracted, a quality like courage or timidity is an entity that may be transferred. In some of these cases we may say that a quality is hypostatised into something resembling substance, in others that a function or relation is treated like an inherent quality belonging to the substance of the thing. The latter case would be well illustrated by the common savage notion of obtaining a man's courage by eating him or those portions of him in which the courage is held to reside. Even good fortune is perhaps a something that behaves like a physical quality, and at a higher stage grace may be transferred by the laying on of hands. Indeed the tendency to turn qualities, functions and relations into substances is very persistent at much higher stages of thought, since it arises from the difficulty of forming a clear concept of anything without conceiving it thereby as distinct and separate in its essence from other things, and what is so distinct and separate readily becomes self-subsisting. But if in early thought, relations and qualities tend to become substances, it is equally true that substances deliquesce into a series of changes. Transformations are effected with the greatest ease. The genie becomes a dragon, a seed, a fire. The big Bear that is in the sky is also incarnated in the bears that are hunted here. The soul goes far away, yet is affected by the fortunes of the body. What belonged to the body but is severed from it affects its fortunes as if it were part of the body still. By a quite similar order of confusion the general is identified with the particular. The ceremonial treatment of an individual animal serves as a bond between the whole species and the performers. When the totem is eaten a link is established with the class of objects to which the totem belongs, and to explain the character of a species a story is told of something that happened to an individual member of it. What is similar functions as though it were the same, so that the maltreatment of an image destroys the original, and to represent the fertilising process assists fertility. Indeed, whatever is connected with a thing in any way may retain strands of connection with the thing, so that shorn hair or nail clippings falling into the hands of an enemy give him physical powers over the original owner, and the sword that has made a wound will afterwards inflame it if allowed to rust, and should be kept clean and bright if the wound is to heal healthily. I call this mass of confusions which underlie the bulk of animism[1] and magic—the two characteristic constructions of primitive thought—a confusion of categories, not as meaning that the categories having been formed are then confounded, but as meaning that they are not—so far as these constructions prevail—adequately distinguished and firmly established. Aspects of the empirical order which for common sense are clearly distinct remained blended and blurred so that we pass from one order of ideas to another without any sense of discontinuity. No lines of demarcation are fixed.

(*b*) But secondly, these confusions have behind them a distinct driving force which accounts for their extravagant development and persistence in certain directions. Common sense, though not ruled by conscious logic, is moved by its own determining forces in a broad sense along the lines which logic afterwards formulates. That is to say, it is guided by experience which it generalises with a certain caution, correcting and limiting one rough generalisation by another, and piecing the results of experience together by a rude analysis and synthesis. In the court of common sense, though there be no formulae, good evidence is already distinguished from bad, and good evidence consists either in reasoning from admitted data or in some fact or facts of perception to which one can point. Now to have come thus far in the course of rationalisation is to have advanced a stage in human thought, for we find below it a stage marked with tolerable clearness in which it is neither perception of relevant facts nor dispassionate reasoning from admitted data, but partly the drift of fancy and much more the sway of impulse-feeling which determines belief. By the drift of fancy I mean the incalculable movements of ideas in the imagination under the stress of chance associations, of the play of words and of other forces having no relation to the real evidence for a belief. By the sway of impulse-feeling I mean that in the lowest stages of the human mind ideas, propounded by no matter what, tend to be accepted if they suit our feelings, and to be rejected if they annoy. Acceptance and rejection are the primary attitudes out of which reluctant affirmation or denial are developed by differentiation. Ideas arise, as we have seen, in the practical sphere as the directive element in desire. Hence at the outset between the willing retention of an idea and the desire of the object to which the idea refers there is very little difference. Hence, further, untutored minds retain a difficulty in affirming resolutely that which they dislike to believe, and indeed this difficulty, like others that belong to the more elementary stages, persists in the highest thought, and not seldom influences it. In the lower thought it produces a regular make-believe, which clearly plays a large part in magic and animism as it does in the doll cult of children. The child likes to give the Teddy Bear a bit of its cake and to think that it eats it, but to make the eating real the child will cheerfully carry out that process himself. The difference is not great between this play and the ceremonial in which the human worshippers eat the material sacrifice while the gods feed upon the spirit. As long as it is a source of mental comfort to think that a spirit has accepted a sacrifice and will be appeased by it the belief itself will flourish demanding no more sustenance than the formal acts required by tradition with some sense of mystery, some unknown formulae or secret rites at the back, to draw as it were a veil behind which the transaction which the senses cannot witness may be supposed to go forward. Lastly, if the ceremonial is so arranged as to satisfy the motor impulses, if for the satisfaction of anger there is some smiting of a victim to be done, if in rejoicing there is dancing, or to summon the war god music and beating of drums, the action still more directly satisfies a felt want, and has a physical as well as a psychic appropriateness.

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[1] The term is used here to include along with the idea of spirits in man and things the vague animatism which merely fails to differentiate the animate and conscious from the inanimate and unconscious. Animism in the narrower sense to which many writers would confine it, is a higher development, but still retains the confusion of disparate elements, only in a more explicit fashion. When animism is purged of these contradictions it becomes a theory of separate spirits which may figure in any of the higher philosophies or religions and I should say that the term animism ceases to apply. As I use the term, therefore, it is intended to cover every grade at which the material and the spiritual are imperfectly distinguished.

Indeed in interpreting primitive belief it is possible that we ought very often to invert what is for us the logical order. We see food implements and possibly wives or slaves buried with the dead by some primitive folk, and we say, ‘ They believe that the dead continue to live in much the same way and to need the same things : therefore they give them what they will need.’ Perhaps what we should say is rather, ‘ The mass of sentiments and emotions stirred by death impel the mourners to acts of respect, affection and sacrifice. As they come to give to themselves or perhaps to their enquiring children some account of these acts they can express their meaning only by speaking of the dead as continuing to live, so that the practice emerges from a sentiment, and in turn gives rise to the belief that would justify it.’ If this explanation is correct neither magic nor animism is primitive. What is primitive here, as all through the earlier stages of psychology, is impulse-feeling, and here as in those earlier stages the idea formulates, directs, extends and in a way explains the act to which feeling prompts. This is at least one root of primitive belief. On the other hand the extensions of idea involved in magic and animism—the tendency to clothe one object with the attributes of another not through conscious generalisation but through failure in distinction—seem equally ‘ natural ’ to the dawning intelligence. Idea may suggest impulse, or impulse may lead up to idea. Provided there is fundamental harmony with feeling, the ideas will be suited to their environment, and will survive. In general we may suppose that the magic ceremony, the animist’s spell-prayer, the witches’ charm all have an efficacy of their own—bringing relief to the tension of suffering or anxiety, or arousing terror and dismay in the mind of enemies at whom they are aimed. But this emotional suitability considered as evidence for truth stands materially below the rough logic of common sense.

We may then formulate the advance made in passing through the first two sub-stages of human thought much as follows. With the origin of language there arises the germ of the power to group experiential data in accordance with their affinities, and so to build up conceptions of individuals, groups and classes as the subjects of rough and ready generalisations. With regard to matters standing out very plainly in experience or very close to practical interests there is not room for much divergence in method. People are not to be persuaded that thirst can be satisfied without drinking, or that a flint stone is soft to lie on. But outside the limited area of readily tested belief lies a mass of more doubtful ideas of great significance in human life. In this region we find in the first stage that the movements of fancy under the sway of feeling take the lead in forming belief, and that the ideas formed are so obscure and inconsistent as to blur the deepest lines of distinction drawn for more developed thought in the logical categories. We may then consider the first stage in human thought to be one in which the process of organising experience into the common categories is incomplete, and the evidence for the truth of an idea is not yet separate from the qualities which make it pleasant. The transition to the second stage, which we have called that of common sense, witnesses (1) the organisation of ideas in accordance with the categories, and (2) the differentiation of belief from feeling. Neither of these processes is to be understood as being derived as yet from any abstract principle. The categories are not known in the abstract, and there are no laws or formulae of truth, only experience has begun to shape the world of ideas and of language into that form in which logic finds it—the form in which concrete substances and their functions, attributes and relations are clear enough and are quite distinct from one another : the world again where proof is already one thing and liking another. These are the simple essentials of that empirical order which represents the workaday world as it presents itself to the average civilised man, outside the scientific laboratory, the church or the lecture room. We must consider its most distinctive product to be the general idea which works well enough in the greater portion of its sphere and only wavers about its frontiers, as distinct from the concept which is exact and clearly delimited.

(3) Now this order and the methods which establish it are exposed to attack from more than one angle. On the one hand, there is the risk of self-criticism. This may be said to begin with the demand for exactitude, a demand to which practical interests cannot always close their ears. But the criterion of exactitude applied to loose generalisation means criticism and definition, and opens the road to science and philosophy, wherein the structural categories themselves will not escape attention. To this road we must return later. Let us notice first the other angle of attack. The world of common sense is not the whole world. Some would say it is not the real world at all. Whether that is so or not we shall have to enquire, but granted for the moment that its world is real, still it is not the whole world. Worse, it is not a world that explains itself. The forces that produce the play of action visible within it are not themselves within it. This is no metaphysical dogma, but, for us, provable fact. Take the course of a disease. Common sense moving on the plane of perception can diagnose certain symptoms, make a fair prognosis of the course of events, and apply palliatives or even remedies with a greater or less degree of practical success. The microscope reveals germs, and modifications of cell tissues, chemistry traces actions and reactions all invisible to common perception and all essential to a true understanding of the matter. Whether the 'scientific' account of causation is or can be adequate is a further question which for the moment we do not raise. Enough is known, however, to prove that even for the inanimate world the working of causation is definitely not discoverable on the plane of common sense. 'Man joins

and disjoins bodies; the rest nature transacts within.' Thus was the measure of empirical knowledge and its practical application adequately and succinctly described. And if this limitation is true of the material order with its relative simplicity, still more is it true of life and consciousness. Man knows little of himself, but he knows enough to justify the broad truth of the metaphor used above, that the sphere of consciousness is but an illuminated spot on the surface of a deep sea.

But the forces within the depths are all the time at work. They direct our movements and give form to our thought. Nor are we in fact cut off from the knowledge of them by any impassable barrier like that which in some metaphysical systems separates appearance from reality. As the light gathers in intensity and concentration it penetrates here and there below the surface. But with regard to our knowledge of underlying forces we may usefully distinguish three phases. In the first place, to begin with that which is last in order of development but most intelligible in the order of logic, we might attain to a clear and untroubled vision of the forces as such. This would involve an enlargement of our experience as well as an improvement of our methods, of which we shall have to speak. In the terms of our metaphor it would imply that the light had penetrated below the surface to the depths. But in the second place and short of this we may have an obscure and imperfect glimpse of underlying realities. We may have a sense that they are there without knowing what they are, or (what is more frequent) our dim sense may clothe itself in a misleading shape of concrete definiteness, and we may feel an intense conviction of luminous truth when all the time the actual images that we possess are mere shadows, and what is working within us is something far other than that which we suppose. This leads us to the third and lowest grade, where the unseen forces are also unthought of, but where none the less they affect our thought, shape our theories and guide our impulses. In this capacity they are apt to intrude as disturbing influences on the world of common sense, arresting its work of systematisation on its own plane, by obtruding the element of the incalculable and bringing in the emotions of fear and hope to distort the cooler processes of inference and belief.

In this form underlying reality is at work upon consciousness from the first, and, as we have seen in the analysis of magic and animism, Thought even before the empirical order is formed is by no means content with the world that it can see and touch. It has its view of the processes that underlie the tangible and visible, and this view is in a certain sense a theory of causation and a conception of the supersensible. But in this connection we must be very careful to hold different stages of development apart. Neither magic nor animism is as yet in any strictness a theory of the supersensible or supernatural, because as long as they are dominant there is as yet no theory of the sensible and natural. More than that there is not in strictness any theory at all in the sense of a connected system of articulate thoughts. There are beliefs, ceremonies, practices, which we can reduce to principles and so form into a theory, but if those who held them possessed the same powers of reflection they would cease to hold them. Nor are the spirits of animism or the powers of magic supposed to be supernatural. Some spirits have mysterious powers. But spirits as such are just like ourselves, or they are the life or the functions of things precipitated into an image—

> The troll and gnome and dwerg
> And the gods of cliff and berg
> Were about us and beneath us and above.

There was not one order of this perceptual world and another of the imperceptible. The magic rain-making was a quite natural process if anything was natural. The harvest might be improved as obviously by prescribed representations of a fertilising process as by the equally unintelligible virtues of manure. The distinction which makes the one method practical and relegates the other to the clouds of superstition exists for us, not for the honest magic worker. No doubt some things were plain, while round them rose a thin cloud of mystery, which gradually deepened into an impenetrable veil, and no doubt it was within the cloud confines, and most of all in its darker recesses, that magic and spirit worship flourished most. No doubt the vague notions which they employ met intellectual as well as emotional needs and served to bridge the large and numerous gaps in the inchoate order of experience. But this is not to say that either magic or animism was an explicit theory of a deeper reality underlying the order which common sense had evolved. For magic and animism precede the mature formation of that order, while the contrast between experience and reality only comes into view after it is firmly established. The recognition of the supernatural as such is not primitive, but comes at a relatively high stage of development.

(4) But now if magic and animism belong in essentials to a lower stage of thought, what takes their place when the empirical order is formed? We are not to suppose that they are extirpated by common sense. On the contrary, they retain much of their power, but are overlaid by more developed conceptions. The mind is never satisfied with the empirical order which fails to solve many of its deepest and most urgent problems, and at every stage it meets the need with ideas of an order suited to and conditioned by its development at that stage. At the point at which the empirical order is well developed the animistic spirits are in greater or less degree subordinated to a god or gods who, like other objects of common sense, are clearly and vividly conceived. As compared with a spirit the god has a distinct personality. He has a home, on Mount Olympus or on Mount Seir. He has a history and a character, friends and enemies, very possibly wives and children. From an abstraction he has become something concrete. He has evolved into a man, and indeed into a superman, *i.e.* a being with human feelings but more than human strength. He is distinct from any material, from the stone or the image or the animal in which his ancestor the spirit was merged. Also in sympathy with the general extension of order in experience he has much more extensive powers than a spirit. From being the underlying vital principle of a tree he has become the god of vegetation, perhaps the god of all the earth or of the sea. Or

again he is the god of the people, the centre of national patriotism, and destined accordingly to a higher elevation, to sit enthroned among the congregation of gods, to deny their right to worship and ultimately to existence.

Thus the divine takes independent shape, and the gods have a world of their own, a world on the border of the empirical, but neither threatening it with conquest nor divided by any very scientific frontier. Indeed, at the outset there is little difficulty in mutual accommodation. The empirical order is not so firmly established but that miraculous interventions may obtain credence, nor have the structural categories been thought out to the point at which philosophical difficulties interpose, nor has criticism turned its edge upon the foundations of the supernatural. There are rules of art, but the craft has a god to help with that divine touch which no rule can fully secure, to temper the iron to the right point, to raise the cream and keep the milk from turning sour. In the graver issues of life, where human control is still very weak, prayer and ceremonial are of wonderful psychic staying power, at lowest as an anodyne, at best as a tonic and an inspiration. The two orders help each other, and conflict is but occasional and unnecessary.

(5) It is otherwise as the organising work of common sense draws towards the limit. As the Mind extends its sphere and begins definitely to conceive Nature as a whole, as a system, in short as *φύσις*, it must also begin to be aware of its own methods, of the categories which it uses and the postulates on which it rests. Long before this stage is reached the fatal demand for exactitude has been raised. The sciences of number and of space have begun to take shape, and accuracy has been practised in the records of astronomy. Alongside the looser ideas of common sense, bodies of accurately defined and nicely correlated concepts have arisen in arithmetic and geometry. Men have learnt what it is to observe and describe accurately, and the distinction between a vague generality and a strictly universal relation can no longer be missed. On this side the growth of science engenders discontent with the empirical order as rendered by com-

mon sense. On another side, it threatens the supernatural, with the demand for evidence and for consistency. The old easy-going acceptance of tradition is disturbed. The gods must give an account of themselves or vanish. With the consciousness of methods, postulates and conditions of sound thinking, we have passed the limits of unreflective development and entered those of methodical construction. Let us carefully consider the position at this stage, and the problem to be solved.

We first note the characteristics of the empirical order. To begin with, as its name indicates, it has been built up on the basis of experience, and the units of experience are objects of perception. Without seeking for the moment to analyse the phrase, we may point out that perception bears, not only upon the events of the material world, the qualities, motions and changes of material objects, but also on the inner world of consciousness, and that by the analysis and synthesis of perceptual data, by generalisation and deduction, we arrive at the connective ideas which we have treated as the essential tissue of the world of common sense, and which embody and connect for us, knowledge both of nature in the narrower sense of that term, and of human nature. Given that we can observe, and by analysis, synthesis and generalisation construct and apply ideas and judgments dealing with our surroundings, we have the simple foundations of common sense knowledge. When experience is specified as the foundation of common sense, it means experience worked up into an order of ideas by the factors specified. The same factors suffice to explain the power of calculation where even within the world of common sense we seem to reason *a priori* rather than empirically. For both the number and the space concepts are derivable from the empirical order by analysis, and calculation is at bottom a putting together, a piecing and re-piecing of the thought-elements so provided. Lastly, within the world of common sense and before we reach science, the process of inference is at least so far explicit that the distinction of grounded truth on the one hand, and fallacy, fancy and make-believe upon the other, is fully apparent. It is here in particular that common sense represents an advance on the modes of thought typified by primitive magic, and offers a point of possible resistance to the dreamier world of mysticism and even of religion in general.

Now this common-sense method with its dawning science of calculation gives men a certain power of dealing with their environment. But it does not meet the fundamental problems of life. It gives men neither practical aid nor mental peace in face of the issues of death, of disgrace, of the deeper moral difficulties, the more searching problems of social life. The reason of its failure has been set forth already. It is that though it moves with some sureness within its own area, its area is, relatively speaking, the surface of life, and there are depths below the surface in which the springs of life lie hid. We have seen how from these springs arise the impulses and sentiments that get themselves clothed with ideas and embodied in traditions. As long as common sense is itself only struggling for existence, tradition passes unquestioned and the gods survive. But as soon as the empirical method gains the confidence that comes from success on its own lines, a new position is reached. The adult mind will make a corresponding demand on the religious tradition. Men will by no means be contented to leave fundamentals alone, but in dealing with them they will require a certain logic, a certain coherence, a certain account of the relations between the proposed solution and the empirical order in which, so far as it goes, they have come to place deserved confidence. In short, as there has arisen a natural or practical order so there must now be a reasoned religious order—a coherent theory of final problems, and between the two orders there must be an intelligible relation. These requirements set the problem to the higher religions and the philosophies of the world. We may broadly sum up the position in a couple of sentences. Slowly asserting itself against the illusions and confusions of primitive thought, common sense has laid down the lines of an empirical order in the world of perception. But this order renders no adequate account of the foundation problems. For their solution a theory of reality is required, and theories arise with a coherence and cogency of their own, but distinct from, and even opposed to the teachings of common sense. Thus there come to be two orders of thought, and the problem of their relation constitutes the task set to the higher stages of mental development. The work of the two lower human stages is essentially to evolve the empirical order, that of the higher stages is to relate the empirical order to the underlying conditions of reality.

CHAPTER VII

THE TWO ORDERS

(1) The problem of thought in its higher phases, whether as Philosophy or as Science, as Religion or as Art, is one of Reconstruction. The origin and nature of this problem only becomes fully intelligible in the light of the theory of evolution. That the deliverances of ordinary perception and the inferences of common sense should possess a certain validity and yet provide a very inadequate basis for a final interpretation of reality is in general terms perfectly intelligible to the evolutionist. For the student of mental evolution, perception and thought are alike functions of a structure which has grown up under the conditions of survival. What is generally necessary to such structures is merely that they should answer their purpose, and their purpose—or rather their function—is that of preserving the stock. For this it is necessary at bottom that they should induce suitable motor responses to changes of the environment. One way in which this might be done is certainly by the growth of a structure whose function should consist precisely in cognition—in knowing what the environment is, how it changes, and how it is going to change. But (*a*) this is not the only possible method of adjustment. The study of reflex action and of instinct yields overwhelming evidence that behaviour may be adjusted to the requirements of the organism in accordance with changes of the environment without knowledge on the part of the organism of what it is doing or why it is doing it. It is thus at least possible that there should be a point to point correspondence between changes in the environment and changes in the organism resulting in

behaviour suited to the needs of the organism, yet nowhere implying knowledge of what is going forward. So theoretically it is possible that there should be a point to point correspondence between our thought, or any portion of our thought, and the real order without a true apprehension of that order. Indeed, if we take the scientific order as real, we are directly forced to admit the existence of such a correspondence at the lower stage of common sense, wherever we arrive at sound practical conclusions by methods or on grounds which are inadequate or false. The familiar experience of day and night and the observed position of the westering sun suffice to tell the savage that the darkness is at hand, and he will take his measures accordingly, and not a whit the worse because his mental construction of the sun's movements is scientifically false. The housewife can boil the kettle though she is innocent as the babe of the thermal laws involved in the operation. True, there are occasions on which the limitations of common sense will come into play. It is not prepared for all the exceptions which science can understand and foresee, and here the difference between a deeper and more superficial knowledge will break out and have practical consequences. Both in its successes and in its failures the structure of common-sense knowledge reveals itself as a development adapted to the normal course of human environment, and adapted primarily to action within that environment and to understanding only as a means to action. The circumstance, then, that common sense has its validity as a practical guide is not to be taken, without further parley, as evidence that it renders a true account of our surroundings. It neither excludes this possibility nor decides in favour of it. We may reach sound practical conclusions from wrong theoretical premises.

(*b*) There is a further point of great importance. Even if our common-sense knowledge be sound as far as it goes, it may also be very inadequate. It is, to begin with, limited by perception. Now our perceptive faculties grow up under the ordinary conditions of development and they evolve—apart from artificial selection and training—only to the point of signalling to us certain changes in the environment. Wherever in any species this signalling apparatus is adequate to the maintenance of the stock at a sufficient rate, no further development is to be expected from natural selection and the laws of inheritance. Hence in the lower orders of the organic kingdom where the rate of reproduction is very high, and it is possible for very large numbers to perish in immaturity without the destruction of the stock, a very low grade of accuracy in response may secure the survival of a sufficient fraction of those born to carry on the life of the species. As the rate of reproduction diminishes, the individual acquires a higher value, and the necessity for judicious action becomes more imperative. Greater powers of perception and inference are evolved, and the fine structures of eye and ear come into being. But these grow up by the increasing specialisation of structures that are originally rude, and limitation is written over every page of their history. Thus the ear is only susceptible to the impulse of aerial waves of a certain length and frequency. To other waves differing from these only in quantity it is deaf. The eye begins to respond to transverse waves of a certain length, and there arises in our consciousness the sensation of a dark red. As the wave lengths diminish, the colours change till they reach the violet and then again it is dark. We have no sense organ to respond to electrical waves in general. We can see nothing distinctly that does not subtend a certain definite angle upon the retina, and the optimist who told us that man had not

> the microscopic eye
> For the plain reason—man is not a fly,

wrote before the days of bacteriology. Could man by direct perception have seen the microbe in the infected substance, the history of medicine would have been very different. In place of this means of combating disease, man has only some indirect and very imperfect perceptual signals—the disgust at putrefying substance, the aversion to the spectacle of disease, the fear of infected persons, the early preference for cooked food, the aversion to close animal contacts and so forth. If we ask why man is left without a power so useful, the answer can only be given in very general terms. Negatively, the human body is not the product of a finished design adapting it accurately to all its needs. Positively, it is the development in all its organs of a far ruder structure. By a ruthless elimination of failures, the organs are rough-hewn and finally polished down at certain points to an accurate adjustment to requirements. But nature makes no inventions like telephones or microscopes. It works upon what is there, and in perfecting specialises it to one function, abandoning others. If the human race can get along and survive with sight adapted to our colour scale and to the sizes and distances which we familiarly judge, that is enough for nature. The fact that man would do infinitely better if with this he could combine the eye of the telescope and the microscope is nothing to her. For to drop the too ready metaphor of personification, the physical structure is determined only by the conditions of survival, not by the requirements of an ideal type or a perfect economy.

It is not only in its data but in its use of them that ordinary thought betrays its origin. The common-sense idea is a practically-useful idea, and as long as it ' works,' common sense cares little for criticism. The ' solidity ' of the table means that it will give you a nasty bump if you run against it. That is definition enough for the workaday world. The structural categories which appear fundamental and tend to be used as sieves which only let certain kinds of experience through into the admitted tradition, are in fact products of certain elementary processes, which have been specified, working within the empirical order. They are growths, and they have arisen at the outset under fundamentally the same conditions as those which we have traced in the rise of perception. Only as human purposes develop and truth becomes an object do more refined conditions come into play; of these conditions, and of their growth in general, we shall have a word more to say at a later stage. For the moment we may be content to note that whether we look at its data or its methods, the whole structure of the empirical order reveals itself as a specific development arising under conditions which show that it can be at best only a partial rendering of certain aspects of reality.

As this rendering is found inadequate, as deeper experiences and larger needs take shape, the second order is formed, and we get the dualism of religion and common experience. In this dualism the relativity of common sense is insisted on, and the need for an absolute truth proclaimed. But the truth which claims to be most secure too often rests on methods which are most fragile. It is indeed itself like common sense, a structure determined at bottom by the response of the Mind to the conditions under which it lives and grows, and though critical in that it demands internal order and coherence, it passes without that self-examination which would reveal the fundamental insecurity of the whole fabric.

(2) In this account it will not have escaped the critic that we are assuming a good deal. Virtually, we have been speaking as though reality in some of its main features were known to us. We have been assuming that there is a certain environment, material or otherwise; that living, conscious organisms arise within this environment; that they respond to its changes and thereby preserve themselves and are able to produce and bring up their young; that in this way, in accordance with the ordinary view of heredity, new species are formed, organs develop and so forth. Assuming all this we can in a general way understand how the empirical order might arise, and how it might have a certain practical validity and yet be a very imperfect, possibly a wholly false rendering of reality. But what guarantee have we for any one of these assumptions? How do we know anything about this reality which is distinct from the empirical order? The empirical order is that in which we ourselves live, in which our thought moves and has its being. How are we to get beyond it? The reply is that in one sense we never get beyond. Our own experience and our own thought remain the sole basis of our knowledge. If they yield us no truth then we possess none. Nevertheless experience as extended by observation and experiment, as refined and

remodelled by analytical and comparative methods, undergoes a reconstruction which it is logically possible to take as genuine knowledge of reality, while recognising a narrower experience and a cruder thought-order as an imperfect and even misleading interpretation of the Real. There are here assumptions as to the final validity of thought which require justification, and the lines of this justification will be summarily indicated at a later stage. Our first task will be to follow out the process of reconstruction itself in its principal steps.

(3) The impulse to penetrate deeper into Reality has more than one source. The improvement of the mechanical arts requires more consecutive effort and gives rise to problems needing some analysis to solve them. Some of those problems have an interest of their own and the spirit of enquiry, active in every normal human child, finds stimulus and sustenance suited to the adult. Men have to measure and to calculate and here, as Plato maintained, was the means of 'turning the eye of the soul' to the universal. The loose 'general idea' of common sense is turned into the exact concept which is to be the pivot of science and philosophy. For the rough and ready inference that serves tolerably well for practical needs, are substituted more rigid deduction and more exact calculation. Finally, enquiry no longer ceases when some urgent practical aim is secured, but begins to be interesting on its own account and is pursued consecutively through the ramifications of a subject. Conceptual thought, strict reasoning and consecutive enquiry are the general marks of intellectual reconstruction but the moving impulses are neither wholly practical nor purely theoretic.

We saw that the common-sense order not only failed on the side of knowledge, but even more conspicuously in the matter of the spiritual necessities of man. The craving for spiritual satisfaction is as potent an influence, at least in the earlier stage of reconstruction, as the desire for consistency, completeness or, to put it generally, for truth for its own sake, and we may broadly distinguish attempts at reconstruction in accordance with the dominant motive as primarily religious or primarily scientific and philosophical. But we must not hastily assume any simple order of succession as between the two. On the contrary, the religious and the philosophical movements influence, and even interpenetrate one another. Nor can we here endeavour to trace the filiation of thought, for which indeed many links are wanting. Just this much may be said. In the oldest civilisations of Babylonia and Egypt, the early invention of writing first made possible a connected development of thought from generation to generation. The formative sciences began to appear towards the close of the third millennium B.C. We have an Egyptian text-book on arithmetic with some matter of algebraical character, and some geometry—not pure land-measurement—from the 18th dynasty, pointing back to sources as old as the 12th dynasty. We have early Babylonian tables of squares and cubes, and we have the early observational astronomy. That is to say, we have the beginnings of an orderly and systematic treatment of certain subjects. Further, through the second millennium we have clearly in Egypt a growing dissatisfaction with the traditional popular polytheism, and an effort towards a more coherent and spiritual conception, whether monotheistic or pantheistic in tendency. But it is not till the first millennium, perhaps from about 800 B.C., that we get a decided movement, and then during the next three or four centuries we find something that looks like a wave of higher impulse spreading over the centres of civilisation. We have the development of orthodox Brahmanism, followed by the two great 'heresies' of Jainism and Buddhism, in India, the beginnings of ethical monotheism in Hebrew prophecy, the mysticism, and close upon it the ethical idealism of China, and finally the philosophic movement in Greece. What measure of interconnection we are to postulate among these movements, how far we are to suppose a direct propagation of ideas, or at least of stimulus by unknown contacts, how much is due to independent development, it is not yet possible to say. But during that period the foundations of our own thought and religion were laid. The thinkers of that time still speak to us. The questions they raised are still our questions. Of the creeds, systems, and methods of thought which have since dominated civilisation, Brahmanism, Buddhism, the Confucian ethics and Greek philosophy and science were born within that period, while Christianity and Islam were engendered later, out of the influences which then came to birth. This, then, is the foundation period of the Reconstruction.

(4) It is not within our purpose to follow the movement historically, but to distinguish its leading phases, noting only those points which have special significance for the general development of Mind. We must deal first with the work of the religious impulses, which in their dissatisfaction with the empirical order, urge the Mind on to the creation of a world of its own.

For it is the irony of human thought that experience itself forces on man problems which it cannot solve, and yet successively destroys all solutions which rest on any authority but its own. Not that religion is wholly divorced from experience. There are at the core of religious psychology elements of genuine experience, which as experience is just as real as the sensations of heat and cold. There is a true spiritual insight, that is to say, an apprehension of the workings of the psychical, a sense of those deeper realities on which our personal life and our relations to others rest. Such insight is for most men fitful, and reached only through some experience heavily charged with emotion. It may come in the romance of love or through the equally passionate and less selfish devotion to a child, through the stress of danger, or of temptation, or more calmly and equably in the communion with nature, or in the clear-sighted vision of large human issues and the ordered movement of the world. What we actually experience in such cases takes shape in our ideas and still more in the language in which we seek to describe it in accordance with the traditional religion of our time. If we could get the experience 'pure,' *i.e.* stripped of all the inferential implications which description involves, we should have a core of reality as sound and solid as our experience of space or of motion. But the case of religion is one in which it is more than usually difficult to get our experience 'pure' and unmixed with extraneous elements, and the movements of the religious consciousness are subjected throughout to the great driving force of the demand of feeling, in the widest sense of that term, for satisfaction. Man requires to be in some sort reconciled with his place in nature. He asks for consolation in grief, redemption from sin and disgrace, stimulus in practice, the guidance and encouragement of an ideal of character and a rule of life. For these emotional needs, bound up with much that is strong and good as well as with much that is weak and poor in our nature, he looks to religion for satisfaction. The religious doctrine that is to prevail must answer to these needs, and thus it will embody elements responding not only to our personal and self-centred cravings, but to our ethical and social feelings and ideas, to our sense of justice and mercy, possibly also to our lust for battle, domination and cruelty. The ethics of an age or a people will be reflected in its religion, though, let us note, they will also be reflected back by its religion, modified in character, intensity or direction. The causation is not one-sided, but reciprocal, and so far as religion can take up a new demand, absorb it into its system and find a vent for it in some new form, it may survive change and preserve itself by adaptation. The plasticity of Christianity and more particularly of Romanism in this regard has been a main condition of its prolonged hold on vastly divergent masses of men. But this does not affect the main point. Religion cannot be imposed as a rigid system on any sort or condition of men without regard to their characteristics. There must be either an actual harmony or the conditions of a possible harmony which will grow if the religion is to be a vital part of the social structure. This necessity operates throughout the history of religion. We have seen it at work in the lowest stages of belief. But there it operated without check. As thought in its advance becomes clearer and more articulate a new condition of harmony appears. There must be intellectual or speculative coherence. The deliverances of the religious mind must consist with one another. There must emerge a dogmatic system forming a coherent and ordered whole. But order and coherence are of the essence of logic and reason, and religion must therefore make its account with these factors of mental life. Again, there is a parallel development of ethical feeling, which as it becomes conscious, demands a greater measure of harmony in personal and social life, and the religious system must provide a basis for such harmony and discard elements of teaching that conflict with it. The higher religion therefore sets up a definite and reasoned construction, a theory of the world and of man, an ideal of life, a unified system of thought and action.

But though there are logical and ethical conditions under which the religions move, they are not based squarely on experience, nor is their practical order educed from an investigation of the actual conditions of harmony. They take up a position above experience, and reasoning downward therefrom determine the destiny of man and prescribe the laws of conduct. Their appeal is in the last resort to ' faith,' to the inner light or to the wisdom of the illuminated. They may use historical narratives or miraculous signs as buttresses of faith, but at bottom they know that these are only outworks to impress the vulgar. The religious order stands on its own basis. But as the common-sense order is equally firm the result is a virtual recognition of two orders such as may be said roughly to express the attitude of popular Christianity. Here is our world, the world of space and time, of inanimate matter and of conscious human life, the scene of our personal history and the theatre of our efforts. Over there beyond the bounds of death is another world, where we shall live again and where the Kingdom of God is now. Both worlds are real, and for all practical purposes both have their own laws. Doubtless God rules this world too. He made it out of nothing, and could destroy it as a slip of paper in the fire, but it is part of His plan to let it run its course guided by the immutable laws of matter and the free will of man. Our guidance in this world is the empirical order as elaborated by science. Only on the side of ethico-religious duty do we come into regular contact with the spiritual order, and direct interventions of Providence in answer to prayer are irregular and uncertain. The two orders issue, in theory, from one being, but in practice they are two. They touch here and there and mechanically interact, but in the main they are self-dependent and equally real. Substantially, this form of solution may be regarded as the common property of Monotheism, the tendency of which is always to conceive of the Deity as Creator and Ruler set above and over, and so outside the world, which is accordingly a separate entity. That any such theory must make its account with the opposite drive towards Monism, which would merge the world in the Divine nature, is an interesting point. It is also the source of many logical and moral incoherences and inconsistencies which need not detain us here. It is sufficient to note the extent to which a distinctly dualistic system is possible, and to observe that it is stronger in popular practice than in the closer reasoning of theory.

(5) In view of the moral incoherence of the world of experience, the alternative to Dualism is to make the spiritual world the one reality, wherein the world of common-sense experience is either mere illusion or a passing and temporary phase. Such is in fact the tendency of the Brahmanic philosophy in its most thorough-going form.[1] The real is One, and the Self is that One, and this self, smaller than a grain of mustard seed and wider than the heavens, passes through all the transformations that make up the life of the world. It lives in every man and in every insect. It does not come into being nor perish, but is the subject of an infinity of incarnations in the bodily prison. Or does it really change or suffer at all? By austerity, by self-repression, by knowledge, by retirement into the innermost recesses of the mind we may each of us find that self, and be at one with the central essence of

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[1] Taking the Vedānta system as interpreted by Sankara as probably the most logical interpretation of the Upanishads (see Mr. George Thibaut's Introduction to the Vedanta Sutras—*Sacred Books of the East*, Vol. XXXIV. esp. pp. ciii. to cxxvii.

things, and for him who is so at one and so at peace the husks of the body, the wrappings of sense fall away, the web of Māya is brushed aside and the reality appears one and unchangeable. The world of space and time, the world of the finite individual, it would seem, is all delusion, and we are left to ask ourselves, is delusion itself something real, is error, though it contains no truth, something that truly exists and has a meaning and an importance for the life of the one?

The final tendency of spiritual Monism is clear, but it becomes clear only to show the insuperable difficulties that would flock about it if pushed to the bitter end, of which not the least violent is the practical one that life must be bent by the strongest, most violent efforts to the supreme work of negating and overcoming that flesh, that outer world which does not in reality exist, to conquering an illusion which in a world that is all Spirit has no intelligible source.

(6) The theoretical and moral paradoxes of a spiritual interpretation of the world-order may lead by reaction to mere scepticism which is the abandonment of any attempt at a consistent theory, or they may lead to a more cautious reconstruction of the spiritual order avowedly on the basis of practical needs and with an abandonment avowed or half avowed of the search for the ultimate truth. The second was the line of thought which in the East culminated in the great system of Buddhism. Here there is in a sense no theory of ultimate reality, for the world as known to us has no reality, at least no substantial reality. It is a world of Impermanence, of flux. Yet it is a world in which we men have to play our part, and our part is to disentangle ourselves from the delusions, the unreal desires, and the consequent sin and suffering involved in Selfhood. We are to escape now not by withdrawing into the recesses of the true Self, for the Self is no longer true or real, but rather by putting off all personal desires and fears, and rising into a purer domain of perfectly selfless and impersonal love, which is to issue forth to all the quarters of the universe. In this emancipation of the

Arahat there is true peace to be found for unhappy men within the circle of this life, and through it alone is the misery of individual life to be finally extinguished, since the attainment of true Arahatship puts an end to the Karma which would otherwise give rise to another vexed personal existence. The solution is practical rather than theoretic. It gives no ultimate account of the nature of things, but prescribes an order of life for man based on the practical and emotional needs of an outlook tinged with melancholy but softened by compassion. From our present point of view it may be regarded as a form of spiritual belief, for, though it holds ultimate reality unknowable, still, for all practical purposes its spiritual order is real, and the only reality that counts. The layman, indeed, may accumulate merit and advance upon the Path without donning the yellow robe of the mendicant, yet it is not through success in the dealings of ordinary life that he will progress, but only by clearing his own mind of personal longings for anything that therein is.

It has already been remarked that the religions on which I have thus briefly touched are not altogether uncritical religions. They have, indeed, a history behind them, they have grown out of the uncritical folk-religions of an earlier time, and sometimes retain embarrassing traces of their past. But a profound religious experience, a wealth of spiritual insight and a great store of human and social feeling has gone to their making, while on the intellectual side their doctrines have been built up with the aid of all the resources of the subtlest dialectic. They do not, in fact, mature until thought in general has been refined to a stage at which an accurate logic and a subtle dialectic are the common property of the learned. They are moreover guided by the idea of unity in life and experience which is the focal point in the higher stages of the correlation of experience. On the other hand, the religious order remains self-poised, independent and even indifferent to ordinary experience. To the mystic mind, or in moments of religious elation, it may seem to transfuse that experience, but it does not really do so, and the reason is that any such transfusion must be a mutual process. There must be a movement from the empirical order itself before a true unity can be formed. Of this movement we shall have next to speak, but we may first endeavour to sum up and explain the results now reached.

We have passed beyond the rough and ready results of what we have called ‘ common sense ’ to a third, or systematic stage of human thought. By methods which have been briefly touched upon an empirical order has been formed, and its growth has ceased to be wholly unconscious. In varying degrees men are aware of its method and tendency. On all hands it is allowed by practice, if not in strict theory, a certain validity. But it is also clear that it does not exhaust reality, and in the opinion of many its value is quite secondary, and even at bottom deceptive. Side by side with it—theoretically, perhaps, in place of it—another order takes shape. This is in general what I have called a spiritual order, and it rests at bottom on the felt needs of man. But it no longer satisfies these needs by an easy acceptance of tradition. For it is also an order ; it is developed with a regard at least for logical consistency and internal coherence. With varying degrees of completeness and success it seeks to satisfy the cravings of men. It propounds an ideal unity of thought, of character, of action, and thus offers a synthesis that is immeasurably wider, as its analysis probes far deeper, than the fragmentary judgments of common sense and the uncritical traditions of the folk-religions. But at the end the satisfaction that it yields is the main proof that it offers of its truth. Such a proof is not recognised as sufficient in logic, and in methods as in result religion and experience fall asunder. There are two orders, and between these two men have, alike in theory and in practice, to effect a choice, a compromise, or a synthesis.

CHAPTER VIII

CONCEPTUAL AND EXPERIENTIAL RECONSTRUCTION

1. If the common-sense order could not satisfy the spiritual cravings of man, neither could it, without serious modification, meet the demands of science.

Scientific thinking, indeed, is not distinguished from common sense by any peculiar assumptions, by any limitations of method or by any restriction to one field of experience rather than another. It is distinguished, first, by its motive. It aims at the discovery of truth and at no other result. It is detached from emotional, personal or practical objects. It is distinguished, secondly, by its continuity and exhaustiveness of treatment. It is not content with isolated results, but conceives its subject as a connected whole and investigates all that it can find which has a bearing thereon. It is distinguished, thirdly, by the exactness which in all its results it seeks to attain. Detachment, continuity and accuracy[1] are the three marks of any science, and any study so marked is scientific, no matter what its subject may be.

Now continuous, consecutive and accurate investigation arises at an early stage in relation to the arts and handicrafts, and though the motive here is in the main practical, we have in the training of the craftsman the beginnings of system. In the early Oriental civilisations we have, further, the beginnings of genuine science. We have Egyptian text-books of arithmetic, and the elaborate astronomical records of Babylonia, while the practical requirements of land measurement laid the foundations of an empirical geometry. But with the early Greek philosophers a new epoch opens.[1] The Ionic philosophers conceived the idea of interrogating Nature without regard to tradition or to the requirements of the religious consciousness in the simple belief that they might find out her secret by reasoning from common observation. They attacked the problem of reality with simple-minded confidence. Modern research goes to show that their theories of the nature of things were crude but intelligible generalisations of experience as they interpreted it: on the question what reality is they agreed that it was something different from reality as it appears, yet whether they took Water, Air, Fire or the Flux of things as the ultimate reality, they founded themselves at bottom on facts of experience which they took to be fundamental and extended by simple and uncritical generalisation. But with the rise of the Eleatic school a new method appears. Reality according to the Eleatics must be one, not clearly because in experience we find that all things are one, but because the conception of Unity satisfies certain intellectual needs. Reality in general from this time forward becomes subject to the character and relations of the concepts by which we can interpret it, and there arises accordingly a systematic effort to construct reality by means of an examination of thought and its products. But the thought-product itself required criticism, and to supply a regular method of criticism was the work of Socrates. The Socratic dialectic aimed in the first place at the accurate definition of meanings, and proceeded by two methods which might be used separately or in combination. On the one hand, a concept might be examined by relation to the experience which it appeared to formulate. This was the foundation of a scientific induction. On the other hand, it might be tested and defined by comparison with other concepts. It would then appear as a species within a genus, or as a genus containing species, or in both relations when the two points of view were combined. This was the foundation of the logic of deduction and of the Classificatory method of systematising knowledge. On these methods successive thinkers from Plato onwards built up theories of Reality with the character of which we are not here concerned. What is important for us is that in so doing they worked out the fundamental categories of experience, defining and distinguishing substance, attribute and relation, quantity and quality, the various forms of causation, the contrast of the universal and the particular, of the necessary and contingent. Nor could these distinctions be carried far without raising the problem of knowledge, the grounds of belief and the principles of reasoning. The world of reality, which is also that of the necessary, the universal and so the eternal, matches the system of accurate knowledge demonstrable by deduction from first principles, while the contingent, the changing, the indefinite, is the sphere of unscientific opinion. The method of demonstration is elaborately set out in the Aristotelian logic, and the relation of its first principles to experience is summarily indicated. They are educed by intelligence operating upon data of sense, but the logic of the operation remains shadowy.

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[1] It is a part of accuracy to state definitely the degree of indefiniteness attaching to our knowledge and the measure of probability attaching to what is uncertain. Hence science is not limited to the definitely known, but also measures the degree of our knowledge where it is incomplete.

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[1] At least in Europe. I will not here enquire how far the conditions mentioned below are satisfied by Hindoo thought as well

The structure of thought in its main outlines was thus revealed by the great philosophers. But meanwhile another movement was on foot. As the problem of reality developed it soon became clear that it must be broken up. Mathematics and astronomy were making progress, and Plato distinguishes five special sciences, while Aristotle lays down a general theory of scientific specialisation and indicates the relation of science to metaphysics. Every science has its own particular field, and, in addition to the principles common to all reasoning, has its own specific principles, consisting in the primary definitions of its subject matter. A special science is conceived as a systematic body of truth educed by syllogistic reasoning from certain original definitions and axioms—the ideal which

Euclid sought to realise in geometry. But, in fact, science was not purely deductive. Systematic observation was practised in astronomy, and by Aristotle himself in biology and sociology, while in the hands of Archimedes experiment guided by mathematical genius of the first order laid the foundations of mechanics. But the ancients had neither the mathematical methods nor the physical instruments which have given to experimental science the range which it has obtained in the modern world. Thus it comes about that when Greek thinkers move outside the region accessible to common observation, they give us conjectures rather than true hypotheses. These conjectures are often singularly brilliant and happy. The atomic theory of Democritus, the evolutionist suggestions from Empedocles onward, bear an interesting analogy to modern ideas. But it is easy to overrate their significance. Modern science, as will be remarked later, often obtains fruitful results by assuming positions which it cannot directly prove because it has worked out methods of reasoning from such assumptions and comparing its results with those of observation. An assumption so treated is a hypothesis. One which cannot be so treated remains a conjecture, and Greek theories of that which lay beyond the domain of direct observation remained for the most part conjectures. It needs no lengthy argument to show that it was in the construction of the conceptual order itself that the main work of the Greek enquirers lay. Thus we have on the one side the fundamental metaphysical enquiries, the analysis of the elementary categories, the statement of the philosophical problem, the elaboration of a deductive logic, the exposition of the ideal of knowledge and truth. On the other hand, we have the positive development of mathematics beginning along with the first philosophic impulse, but continuing long after philosophy had reached and passed its first culmination. We have the first completely systematic exposition of a body of truth in Euclid, the development of theoretical arithmetic, and, growing in importance at the close of Greek activity, the beginnings of algebra. Then we have mathematics applied to mechanics by Archimedes, and to astronomy by the long series of investigators whose work was ultimately reduced to system by Ptolemy. Not that observation was neglected. On the contrary, in astronomy results of great magnitude and, relatively to the instruments available, of surprising accuracy were attained. The catalogue of fixed stars made by Hipparchus was the best available till the time of Tycho Brahe. The same observer measured the length of the year within six minutes, discovered the precession of the equinoxes and knew the difference between the solar and the sidereal day. Indeed it may be said that after the banishment from Athens of Aristarchus for anticipating the Copernican theory the theoretical development of astronomy was small as compared with the advance in the description and accurate measurement of the phenomena. Thus it would be true to say that in astronomy the Greeks had laid the foundations of that union of mathematical reasoning with exact observation on which physical science depends. It would also be true to say that in biology their observations, again relatively to the available instruments, were searching and valuable. On the other hand, it is clear that on this side of knowledge in tracing the history of Greek enquiry we are dealing only with beginnings. If observation is rich in certain quarters of the field it is restricted to those quarters, and generally lacks instruments of precision. Direct experiment again is rare. Such an investigation as that by which Ptolemy determined the angle of the refraction of light in passing from air to water, etc., is quite an exceptional occurrence. Nor in spite of Archimedes at Syracuse, or of the more regular and continuous labours of such men as Hero in the Alexandrian School was the application of scientific principles a field of general interest to the Greek enquirers. As compared with modern times the number of competent journeymen workers was small and in the absence of printed publication of new theories or recorded observations there was not the widespread and continuous interchange of information and criticism which in our world makes the mass of humble workers so important in testing, correcting and developing the theories of genius. The arts of calculation which stimulate exactitude of observation and precision of measurement were weak. The development of arithmetic, in our sense of the term, was hampered by an unfortunate notation, and the decisive step towards a symbolic algebra was only taken by Diophantus in the fourth century A.D., on the eve of the break-up of the old order. Thus no great experiential construction was achieved to match that elaboration of the conceptual order which laid the foundations alike of mathematics, ethics and metaphysics.

2. Viewed as a phase in the development of Mind, the elaboration of the conceptual order appears not as an end in itself, but as preparatory to a higher effort. It yields an ideal of truth, an instrument of reasoning, a self-conscious awareness of the mind's own operations in cognition. Over against the flux, the tangled ends, the disjointed fragments of experience, it has set up the conception of a reasoned coherent order. The next step is to find this order in experience itself, to trace within the flowing, shifting mass the broad and permanent lines of movement which render it an intelligible whole. This synthesis of experience is the goal of the movement which we have traced from its beginnings. To effect it there are required, on the one hand, the systematic and critical examination of experience itself, which, though begun in Greek antiquity, is the peculiar work of modern science; on the other hand—partly as a condition of success, partly as consequence—new methods of organising experience, and close criticism of the functions of the Mind itself—a work in which both science and philosophy have had their share in the modern period. We must endeavour to seize the leading points in the complex movement.

With the death of Aristotle, the great period of constructive philosophy in Greece came to an end, not, we may take it, for lack of fertile, original and constructive minds, but because the work of the conceptual reconstruction of reality had been carried as far as it could go with the materials of experience then available. But Science still flourished, and the advance of Mathematics in particular continued until the social decay of the fourth century arrested intellectual development in the West.

While Europe slumbered and slept, the Arabic schools, under an impulse derived partly from India, partly from the débris of the classical culture, carried on the development of Algebra into a distinct branch of mathematical discipline. By the introduction of the Indian system of numeration they gave new power to arithmetic and by their investigations in alchemy supplied a stimulus to experimentation. The impact of this culture on the West, felt chiefly through the Moorish Kingdom, had its response in the movement of the thirteenth century when we find the basic ideas of modern method, observation and experiment on the one hand and mathematical discipline on the other, proclaimed by Roger Bacon. Bacon was in advance of his time and for some generations the greater portion of the renewed activity of the intellect was directed to the interpretation of the Christian order in terms of ancient philosophy, or to the absorption of classical ideals in literature and art. But with the fifteenth century the Baconian[1] ideas began to come to their own and from Nicholas of Cusa onwards the line of experimental seekers after truth begins to run continuously. Medicine and mathematics, mechanics and astronomy are pursued in a new spirit, till towards the close of the sixteenth century we come to Galileo, and the foundations of the 'first physical synthesis' which is completed in its main outlines by Newton. This synthesis owed its success to a combination of three factors. The first was the systematic pursuit of observation and experiment, the former a revival of the original Aristotelian method as against those of his degenerate followers, the latter owning, as we have seen, antecedents and examples from Greek science but in the main a new growth. The second was the provision of instruments immeasurably extending the range and perfecting the accuracy of observation. Of these, Greek science was almost destitute. The third was the provision of new methods of correlating empirical results by which continuity of physical process can be accurately rendered in conceptual terms, an inference once demonstrated as valid can be applied without need of further authority to the most extensive and heterogeneous material and results educed from experiments are summed up in formulae of universal application, whereby they may be tested, corrected, discarded or confirmed on the evidence of phenomena at first sight most remote from them. The two leading instances of this method which the first great period of modern science contributed were the geometry of Descartes and the calculus of Newton and Leibnitz. The Greeks applied algebraical methods to geometry on occasion, but Descartes first devised a method at once simple and of general application by which geometrical relations being reduced to relations of magnitude and direction could be stated in terms of an algebraic formula and treated by analysis, that is to say, by a process independent of the particular figure in question and valid once for all without need of empirical corroboration. Again, Archimedes had worked on the principle of the integral calculus, *e.g.* in determining the area of the parabola. But Newton and Leibnitz devised general methods of calculating from gross results to rates of change and from rates of continuous change to total results, from the area to the curvature which determines it and from the curvature to the area, from the motion to the correlation of variables which constitutes it or from the correlated variables to the motion. The extension of these methods, combined with the Cartesian geometry, first made it possible to bring physical nature, in its continuity and many sided variableness, under accurate formulae of general application.

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[1] The epithet is surely as justly applicable to the method of the older as to that of the younger Bacon.

3. Despite its brilliant success on its own lines, the new method gave rise to certain questions of principle which were to be the source of long controversy. In the first place, while the new calculus gave results which were concordant with one another and with observation, was its theoretical basis sound? As effected in special cases by Archimedes, integration was a rigorous method.

Were the principles on which it was extended equally rigorous ? In the eyes of many they could only be so regarded by assuming the existence of infinitesimal magnitude, a conception which modern mathematical theory has definitely rejected. Modern mathematicians have satisfied themselves that the basis of the calculus is demonstratively rigorous, but in doing so have to admit that as pursued by many of their predecessors it succeeded in practice without being rigorous in theory. Into these questions I must not attempt to enter here. I note only that they introduce the problem of infinitude into modern philosophy at a new angle, to play a part in general thought which was markedly different from that which it filled in ancient philosophy. To this point we shall presently return. Let us first note a further and a more comprehensive problem arising out of the scientific use of experience. We have seen that in the empirical synthesis great masses of perceivable phenomena could be resumed under a few general laws capable of reduction to mathematical formulae from which the facts could be deduced. Thus, given the laws as known, the facts were explained. Further details could be inferred and they in turn could be verified. Repeated verification, prediction of what would otherwise have been unknown and unguessed, the explanation of numerous apparent contradictions and exceptions when the facts were more fully known, persuade us that the method is sound. But is the persuasion a rational conviction ? If the principles are true, the results must follow. But here are the results, therefore the principles are true. This is in form the fallacy known in logic as a ‘ simple conversion ’ of an illegitimate kind. If the principles do not come from experience, what is their basis ? If they were originally generalised from experience then every further instance in which the results accord with them, however striking and unexpected the accordance may be, is yet at bottom no more than an extension of the experience from which we are generalising, and still confronts us with the question how or on what ground we can justify the generalisation from experience as in principle admissible. These questions raise fundamental issues of the relation of the mind to its object and of thought to experience, from which the men of science on the whole turned aside, contented with their practical success and leaving the point of principle to philosophy, which gradually, to the great damage of its own interests and those of science, became an independent discipline.

The breach was widened by the emergence of a third problem. Success in the correlation of experience by mathematical formulae requires that the data should be set out in a form in which they can be measured against one another. Any concrete change must be analysed into its constituent factors each of which must be measurable in terms of any unit that we may choose, provided that once chosen we keep to it consistently. We are then in a position to ascertain the correlation of the several variations, at the same time ascertaining what is constant. So far as this procedure can be carried, it can bring the manifold variety of the world under uniform rules of universal applicability. The scope of science so conceived hinges then on the elementary concepts through which our data become measurable. Newton required the concept of Space in three dimensions, Time in one dimension, Mass, and Force, and these remained the fundamentals of Dynamics down to our own time. But how far could this mathematical interpretation of experience be carried? Could it deal, for example, with all the data of sense, with what became known as the Secondary qualities of sound, colour, temperature, taste and smell? Could it deal with the phenomena of life and mind, of the relations of men in society? Might it be made to cover ethical relations and solve religious problems? Could it give any account of concrete Reality or formulate a beginning or an end of things? Before Newton wrote, Descartes had conceived the whole of reality external to Mind as Extension, contrasted it with the mind itself as the 'thing which thinks,' and propounded a relation between the two which could only be referred to the miraculous dispensations of the Deity. Now the classical dynamics as we have seen postulated something more than extension and in that degree took away from the simplicity of Descartes' scheme. In expositions of the Theory of Relativity there are symptoms of a reversion to Descartes and a disposition to treat all dynamical problems as at bottom geometrical. The geometry, however, is that of Riemann rather than Euclid, and it is not a spatial system pure, but a spatio-temporal system that is employed. With this development, however, we are not for the moment concerned. However amended, the Cartesian dualism set a problem to modern thought which the work of three centuries has not solved.

4. In this problem the first and most obvious question concerns the Secondary qualities, light, heat, sound, etc. If it is the senses that provide us with the data of our knowledge of external Reality, these no less surely than extension and motion are among the data that they yield. But these Secondary qualities were not amenable to measurement in any far-reaching or satisfactory manner unless they could somehow be equated with modifications of the Primary qualities. It was possible to effect this equation on the lines originally suggested by Democritus and revived by Bacon of regarding the Secondary qualities as modifications of the thinking self effected by the operation upon it of external reality, and this line of explanation became traditional among physicists, who did not, to say the truth, want to be bothered with the question, and were therefore easily satisfied with the solution which, like many other solutions, is simple enough until you look into it. But Berkeley did look into it, and found that, apart altogether from the question how matter could act upon mind, there was a vast and questionable assumption involved. If the blue of the sky which I see is really a modification of my own consciousness why not also the vault of the sky? If the heat, colour or resonance of an object are ' perceptions ' or ' ideas ' of the percipient, how do we know that its extension, figure and motion are anything else? In vain shall we resort to a ' substance ' which possesses or supports or underlies these qualities. For a substance without qualities is a meaningless expression

devoid of content. When we test the reality of the percept the appeal is in principle from one percept to another, and if each and every percept is but the "idea,' *i.e.* a state of the percipient, we move in a world of such ideas in which the whole of the external reference is in fact illusory.

In fact, the result of the first stage in the development of the problem was the Humian scepticism, in which the fabric of knowledge was reduced to 'impressions' and 'ideas' devoid of valid reference beyond themselves. Reconstruction was attempted, in the first instance, by a criticism of Objectivity. It might be that all that we could know lay within the circle of our consciousness, but that within this sphere there was an immutable order which might be rationally apprehended and become the content of science, or irrationally and arbitrarily conceived and so form the content of mere opinion and error. This solution, already put forward in principle by Berkeley, is worked out by Kant on the basis of a theory of the contribution of the mind, not merely to our way of thinking about experience, but to experience itself. The underlying elements of the empirical order are now brought more fully into view. Complex elements are revealed in the apparently simple data of perception, and the structural categories are argued to be not merely results of experience but principles implied in the formation of that order which at first sight we take as simply 'given.'

5. On the validity of this theory more must be said at a later stage. Here I would touch only on its bearing on the conception of our thought-world as a structure in process of growth. The theory takes the whole of our cognition to be a texture woven of elements given in experience by interrelation. The process of interrelation is not learned from experience, for it is involved in learning. But though in this sense *a priori*, neither its methods nor its results can seriously pretend to the kind of certainty claimed for *a priori* truth. On the contrary it acts crudely at the outset and is polished by trial and error; its test is in achievement, its results must be consistent and even in the end mutually necessary, and short of an ideal

whole it is always open to correction and improvement. Thus thought is a growth not merely in the simple sense that experience is enlarged, but in the sense that the structure which holds experience together is a plastic structure, subject to constant modification. In learning there is a double process. Every new item in the process of being recognised acquires a local habitation in its name, that is, in being referred to some part of the existing structure; but the structure itself is silently and slowly, now and then it may even be, suddenly and drastically modified to fit the extension, and such modifications, frequent and familiar enough in relation to ideas of limited application (though even there the structure always maintains a certain stiffness) may be extended to our most universal and fundamental categories, substance and cause, quality, relation and the like. All these we must recognise as expressing principles of interrelation at which mind has arrived in dealing with experience and which it may have to revise and may hope to improve. What remains constant is on the one side the ineluctable element of the given, on the other just the correlating activity itself, its continuity and growth.

This conception has two applications. On the one hand it gives shape to the special enquiry into the historical development of mind. This must be on the one side biological, including the general conditions under which mind has developed in living beings, and psycho-physical, including the conditions of perception which determine the data of our conscious experience; on the other side, psychological and even sociological, covering the manner in which we organise our experience and how this is effected by the interaction of mind with mind and the continuity of the thought-structure through the generations. Here all the sciences that deal with man and all the history of human endeavour, whether in thought, religion, art, industry or political organisation, find a natural unity of meaning and purpose. This is a far-reaching result, but there is a still wider application. For the conception of development must affect the content of all our thought, scientific or other. Truth as such is not relative in the sense that it only professes to hold good for the thinker, but the truth that is accessible to us at a given stage is as much as and no more than our mental structure can compass, conditioned as it is by our psycho-physical limitations, the conceptual methods which we absorb from our predecessors and contemporaries, and the little strength of our own efforts to adapt and improve them. Thus our most fundamental conceptions become ways of apprehending reality or of co-ordinating experiences that have lost all sacrosanct immutability and may require revision and supplementation like everything else that belongs to growth. The structural principles of thought are conceived not as rigid moulds into which all truth must fit, but rather as plastic elements of a growing structure which may be modified without loss of identity to take a wider and fuller experience within their grasp.

6. Thus, on the one hand, the realisation of the subjective factor in knowledge leads to the conception of a mind-structure with a life history of its own, a conception which gives shape to the modern investigation of personal and social psychology. On the other, it engenders the logic of experience. It demands some form of mental operation in which an objective element can be securely predicated. Of such a form immediate experience seems to be the clearest case, and experience has been the term round which the controversies of philosophy have raged. For at first sight we seem in sense-experience to be in direct contact with outer realities, and if it were so, we have here so firm a basis of knowledge that the only question to be discussed would be the method of building upon it. The Berkeleyan criticism soon showed that the matter was not so simple, but even so it left experience standing as so much fact, though fact of an 'internal' psychological kind, and the problem of knowledge was to understand how thought so organised experience as to discover general truth. The Kantian and post-Kantian analysis showed, however, that 'immediate' experience could not be taken as a simple datum. From the outset we assert, and though in sensation or in any form of immediate consciousness

that which we assert may, in a certain sense,[1] be taken as fact, this sense is only reached by an effort of abstraction. Analysis showed that the 'pure experience' which seemed a prime starting-point was an abstraction from which the elements of reference that piece its parts together are omitted. The true starting-point of knowledge is the assertion which assigns an object a place in a permanent order, whereby it enters into relation with other objects. Yet—and this is the paradox of knowledge—this order is itself built up by slow degrees and is certainly not an object of thought until experience is far advanced. The solution of the paradox is that the cognitive life of mind is from the first a correlating activity which connects the successive phases and weaves them into a plastic order to which every new experience is referred. It is true that the precise nature of the reference is determined by relations which are contained in the objects of experience when experience is taken as a whole, but (*a*) since experience comes in fragments, spread over time, to take it as a whole is only possible for a mind which can correlate distinct data, and (*b*) certain methods of correlation, viz. those which involve generalisation are never 'given,' but involve assertions about a whole which is wider than all past experience taken together.

Thus the unit of knowledge is an assertion involving the object in relations, and the 'pure' experience which may be taken as so much 'fact,' is the asserted object denuded of these references.[2]

Objects, then, are not 'given' in experience from without in the simple manner at first supposed by common sense. Hence, even if we assume perception to be an accurate assertion of the outer object, we no longer conceive the one as a photograph or impression of the other. We conceive it as a construction or, if we prefer the term, a reconstruction out of materials of stimulus and psychophysical process in which there is no likeness to the object at all. This criticism of experience, then, becomes the starting-point of the two very different lines of investigation that have been mentioned. On the one hand, it is the point of departure for the investigation of the psychophysical and other processes underlying experience. For, if experience is still the basis of knowledge, it is, genetically considered, a mere effect of the specific reaction of certain complex structures under given conditions. Ultimate in the one sense, it is derivative and relative in the other. On the other hand, the recognition of the reference involved in the bare assertion of objects of experience opens a door of escape from the sceptical interpretation of the idea of Relativity, and, more particularly, from subjective idealism. The problem of knowledge becomes that of verifying these references, and the mode of verifying them is by thorough-going interrelation with one another. This interrelation is the work of the correlating or, as Kant called it, synthetic activity of thought. This he showed to be an original function, with its own appropriate modes of operation, without which no organised body of experience could be formed.[1] When these modes become conscious they are stated in abstract terms, and figure as axioms. In this analysis Kant gave the first critical account of the nature of axioms. For the axiom rests not on apparent self-evidence, the psychological feeling of certitude, but on the correlating function which it formulates in general terms. We shall return to this point later. Here we may be content to remark that in the modern philosophical movement from Kant onwards we have criticism attacking the systematisation effected by thought at both ends. We have it applied alike to the primary data and the supreme correlating principles. Kant himself was clear that these principles have no validity and no real meaning, except in relation to that which is given in experience, and his criticism—as distinguished from his quite inconsistent reconstruction—has so far the same tendency as that of the British empiricists. Thought is that which has the function of correlating experience. What is true is in the last resort judgment based on a duly correlated experience, and thought is the function of correlating experience. There was needed, accordingly, a logic of experience, or a scientific induction, and to elaborate such a logic is as much the problem of modern as the formation of a deductive logic was the task of ancient thought.[1]

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[1] See below, and footnote on following page.

[2] I 'see' a figure over there. Investigation convinces me that it was an illusion. The so-called 'seeing' is a false judgment, what convinces me that it was false being at bottom inconsistency between it and other judgments, *i.e.* the impossibility of correlating it with other objects. Nevertheless, as a mere object of immediate consciousness, *i.e.* apart from its reference to a point of space outside my body, the figure was real. As such it was 'pure' experience or the object of simple apprehension.

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[1] To adapt this general result of the Kantian criticism is not of course to accept his description of the modes of operation in question or to distinguish between what is 'given' and what is not given on anything resembling Kantian lines.

7. The problem of modern science in its most general terms has been commonly stated as the ascertainment of the laws or general relations of coexistence and sequence among phenomena. The term phenomena suggests metaphysical implications which are open to criticism. But if we overlook these for the moment we may take the formula as a statement of the problem of knowledge in its simplest terms, viz. as a correlation of the elements of experience. Now many relations are given in experience, and the function of thought is to use these as data for the discovery of further relations which are not and perhaps cannot be given. On the basis of the given relations thought builds up the conception of a reality continuous with but extending indefinitely beyond experience, containing and explaining the order of experience as a part of itself. It is in this sense that the function of thought is the correlation of empirical data, and this function is primary, that is to say something that thought contributes. But this phrase is easily misunderstood. It does not properly mean that the work of thought is to construct relations which would not otherwise exist. For

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[1] How far such a logic has solved or can solve the problem involved in the relativity of thought and experience is a further question of which more will be said later (Part II, Ch. III-IV). Here I am concerned only to indicate the position of the Logic of Experience in the general movement of philosophic criticism.

the function of thought as a correlating activity is to discover what is already real, and the only thing it constructs is its own system, which it means to correspond to the real order. The proper meaning of the phrase is that thought does not find all the relations that it needs given in experience ready to hand, but is an impulse to find relations which exist but are not given, and to discover a complete connectedness where only a partial order is observable. The Logic of Experience seeks to lay down the principles and conditions upon which this process of correlation is valid.

Of this logic we shall have something to say in the next part. Here we note the terms in which the problem is stated as a characteristic product of modern thought. We may usefully contrast the question, 'What are the relations between this and that datum?' with the 'What is it?' which is the characteristic formula of antiquity for the scientific enquiry into a subject. The older form of enquiry tacitly assumes that there is some typical conception under which the subject can be brought, and which when fully set out will contain the explanation of any of its properties. The thought of antiquity, that is to say, is guided mainly by the impulse to reach certain central conceptions, capable of being stated as definitions from which a number of properties may be deduced. The order of nature, including man and society within it, is seen as an array of types to which actual things approximate. Science is the knowledge of the central essence of the type, and of the properties derived therefrom. So far as actual things diverge from the type it is because they contain elements of ambiguity and indefiniteness which remove them from the purview of science proper, for science deals only with the necessary and the universal. This is not necessarily a static view of nature, for, as in the system of Aristotle, the types might form an ascending series, and it would not have been a very difficult step to conceive the world as a process in which the higher types are realised in succession. But it is a view which places the typical, the complete, the definite as it were on an eminence, and is ill adapted for the systematic study of order in variation. It is, in fact, quite consonant with the conceptual logic, and formulates the range of truth that can be studied with a relatively slender experience and without constant back-reference to experience. The modern problem places the whole field of enquiry more on a level, its uniformities are sought through all the wilderness of variation and change, and its types are rather sign-posts or meeting-points or critical turnings in a continuous area than solitary eminences parted by the void from one another. Its clue is the discovery of an order of which all the terms are comparable *inter se*, with which our experience, with its rich qualitative diversity, can be correlated. Thus our sensations of sound, light, colour, heat, our experiences of touch, resistance, pressure, our perceptions of motion, rest and bodily form can be correlated with the terms of a mechanical system which thus carries the notion of a single order right through the world of perception. Indeed, the success of the mechanical principle in its own sphere tempts to a hasty generalisation which would extend it to the whole of reality, but a very little philosophical criticism is needed to show the fallacy of baldly identifying the life of mind with a process to which it stands related. The further effort of modern thought then is to find a similar order for the world of mind and of life in general, and for this purpose—though as yet the work is but beginning—it has elaborated the comparative method and the governing conception of development. If the mechanical order was the culminating conception of the first movement of modern thought, the evolutionary order holds the same place in the second period, and as the mechanical system provided the common terms by means of which all the variety and change and detail of physical experience could be brought into correlation, so the idea of development enables the facts of structure and function, of life, intelligence and purpose to be seen in their mutual relations. Experience falls into the two series, the mechanical and the developmental, or, as I will venture provisionally to call it, the Teleological. There will remain the final problem of interrelating the two orders, a problem which can never be wholly solved until the two terms of the relation are completely understood, but which it is constantly necessary to state and re-state in the light of the best available knowledge.

8. To many people the march of science seems to narrow the world. The truer view is that it has enormously expanded our conceptions of what is possible in Reality. Hence it is that partly as cause, partly as effect, but altogether in sympathy with the lines of movement already sketched, the idea of the Infinite plays a central part in modern philosophy. Modern thought may almost be said to have reversed the attitude of man to this idea. When the Pythagoreans ranged the One, the Finite and the Good on one side, and the Plural, the Unlimited and the Bad on the other, they expressed the characteristic feeling of the Greek thinker and of the Greek artist. Order, proportion and all that we now call organic unity were the essentials of the Greek ideal. They emerge out of the formless as Aristotle's specific forms arise out of shapeless Matter in its impulse towards the divine. Growth is necessary to them, but necessary as a means. It is valuable only on the way to perfection, which once reached, what need of further growth ? Now this static perfection is almost intolerable to the modern. It bores him like the mediaeval heaven. Movement of itself has become part of the ideal. The fragmentary, with its suggestions of something vaster, the 'broken arc,' the tattered banner of the forlorn hope have a greater charm than the rounded whole and the polish of perfection ; as the gloom, the half lights, the long vistas of dim unending Gothic aisles appeal with a force which classical symmetry can no longer match. The contrast has been stated once for all by a master whose sympathies with both sides were keen and perfectly instructed.

> To-day's brief passion limits their range
> It seethes with the morrow for us, and more,
> They are perfect. How else ? They shall never change.
> We are faulty. Why not ? We have time in store.

What we know and do is a living fragment whose fibres and tendrils stretch out into an immensity beyond, and all that suggests this beyond, be it even failure, sin and suffering, is to us more than the lovely thing of which we see the end.[1]

None the less, there remains the demand of reason and knowledge for wholeness and completeness. Reality is infinite, yet we desire to understand it as a whole. But how can the infinite be a whole? How can it be completely understood without being summed up, and how can it be even potentially summed up unless it be finite? It is not the bare conception of the Infinite which gives rise to the Kantian antinomies but the endeavour to unite the two conceptions of the Infinite and the intelligible order in the idea of an Infinite whole. I shall touch on the question again at a later stage. Here it is only necessary to remark that once again in the conception of all our experience as finite and yet as having roots in the Infinite, we have the distinctive modern view of the world of human thought as relative and yet capable through self-criticism of transcending its own relativity, and relating itself to the vaster whole of which it is only one facet.

This conception again has its justification in the idea of development. For as applied to knowledge the theory of development explains the actual limitations of the mind by the conditions of its genesis. It shows that adequate adjustment of response to environment being a sufficient condition of survival, a psycho-physical structure may be blind to everything but just that which is necessary for such adjustment. But it also reveals an indubitable growth of faculty, and, what is most important, the emergence of powers and interests unconnected with mere survival and concerned with the expansion and improvement of life. It thus indicates that the limits of mind at any given moment are no adamantine barriers, but rather that the boundaries of its operation at any given moment are functions of its development at that moment, and are perfectly capable of extension. It prepares us for the view that by recognising our limits we transcend them and that by knowing a truth to be true only for us, *i.e.* to be the best approximation that we, with our limitations, can make, we know it, with those limitations, absolutely. The final secret of Reconstruction lies in the consciousness of development itself.

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[1] "Euclid always contemplates a straight line as drawn between two definite points. . . . He never thinks of the line as an entity given once and for all as a whole. This careful definition and limitation, so as to exclude an infinity not immediately apparent to the senses, was very characteristic of the Greeks in all their many activities. It is enshrined in the difference between Greek architecture and Gothic architecture, and between the Greek religion and modern religion. The spire on a Gothic cathedral, and the importance of the unbounded straight line in modern geometry are both emblematic of the transformation of the modern world." Whitehead, *Introduction to Mathematics*, p. 119.

9. We see then that the world of advanced thought—the world of philosophy in the older and more legitimate sense in which that term included the sciences—is one in which common thought has undergone a fundamental reconstruction, both in its methods and its data. We have to picture common sense advancing on uncritical lines and building up an order of ideas which has its value but is by no means a perfect mirror of reality. We picture criticism beginning with a sense of this deficiency, with the notion of a real world set over against this mental construction. Such an opposition we saw is implicit in the higher religions and is posed as a definite problem for logical solution from the first hypotheses of the Pre-Socratics onwards. Ancient philosophy defined the problem in general terms, and modern thought, with its emphasis on the subjective factor, has traced the difficulty to its root, and with its developed methods of organising experience has made some notable advances in the work of reconstruction. The foundation of this reconstruction is the entry into the sphere of consciousness, previously concerned only with results, of the data and the processes by which results are obtained. This critical movement begins in the ancient world in the demand for a logical treatment of the conceptual order, with the ideals of unity, system, accuracy and interrelation, with the exposition of the formal conditions of a perfected science. We have here the general conditions of metaphysics and of mathematics, at least in the form which they assumed in antiquity. In modern thought the movement is carried a

stage further, by the systematic application of critical methods to the extension and interrelation of the empirical data at the root of the conceptual order. In place of crude observation we have controlled experiment, and where control is impracticable, numbered and ordered data amenable to statistical computation and the comparative method. The data themselves are obtained and measured by instruments whose results are assured by prior calculation. Thus we have critically considered methods in play at every point in the construction from the provision of the data to the widest principles of interpretation. Meanwhile the subjective factor is more strongly emphasized, the position of the observer becomes material in valuing observation and the narrowness of experience becomes a check on absolute assertion. Though the appeal from experience can only be to more experience, yet we recognise that experience is not all reality and we do our best to extend it. Fixed starting points and absolute principles are replaced by partial views, experimental assumptions, working postulates, which are to be tested by being brought together, and are ultimately confirmed, modified or rejected according as they can or cannot conform to the requirements of a coherent whole. Thought thus becomes a plastic structure subject to constant modification, at any time conditioned by the existing stage in the development of method and by the acquired mass of experience, but constantly through growth overstepping its conditions and expanding as well as tightening its grip. In this conception, while results are resolved back into conditions, the data, the processes, the principles which underlie them, these conditions are also viewed in relation to the results in which their coherence or incoherence, their breadth or narrowness of scope become manifest. The foundation of the movement, then, may be described as a correlation of the thought-structure with its conditions.

The survey of these conditions carries us right through the field of experience and includes therein the history and structure of mind itself. Its aim is to set the organised experience of the race in its right relation to the system of Reality, showing on the one hand how it has grown up, on the other, seeking to determine the extent to which it enables us to judge of Reality as such. While the task set in these terms is infinite as Reality itself we may consider the mind as fairly entering on this phase at the point at which, through the aid of the several movements that have been mentioned, we are able to take a view of the world of our thought as a growth resting on assignable conditions and capable of extension through the intelligent appreciation of those conditions.

This is for thought a new kind of self-consciousness arising gradually in the course of history and realising itself rather through the collective operation of many minds than by change of any innate quality of individual minds. None the less, it involves a new orientation, a change of attitude and direction not less fundamental than that which is implied in the dawn of self-consciousness in the individual. The change is quite parallel to those which we have noted at earlier stages. As the massive experience of the past determined the reaction to present stimulus in such manner as to avoid a pain or procure a satisfaction before the anticipation of pain or pleasure entered into consciousness, as the anticipation of pain or pleasure entered consciousness and determined action in similar cases, though without consciousness of similarity or generalisation, so lastly, general relations operated as explicit grounds of inference without any consciousness of the principles of method logically involved. And just as the anticipated pain or pleasure rose into consciousness as an end of action, and as the general relation that connected different experiences became known for what it was, so finally do the principles underlying generalisation or any other inference come into the conscious area. The advance is always in the same direction, the underlying forces guiding effort are brought into relation with one another and with those that are already known. Every such movement involves a certain 'turning of the eye of the soul,' a new direction of the correlating activity which constitutes the function of consciousness and in that sense a change of quality. The turn by which the mind becomes aware of its life as a unity is what we call the dawn of self-consciousness, and distinguishes the human from the animal mind. The turn by which mind reduces the structure of its thought to its elements to reconstruct its view of reality from the foundations is a quite comparable advance in self-knowledge. Finally, each 'turn' of consciousness reveals a deeper plane of reality. The world, which is for the lowest intelligence nothing but a disconnected series of sense-stimuli, becomes first a network of related objects, then an order of beings persisting through change, and like amid unlikeness, and lastly, a system of forces and principles, mechanical, spiritual or other, whose interplay determines the superficial changes of the shallower plane.

If we conceive the critical movement carried to its completion, we shall have reached a central point from which, in outline, the genesis, the development, the conditions of Mind in man lie open to view, and with them its potentialities and, we may say, its future. The entire history of Mind may be said to lead up to this point, at which it becomes, as we have put it, self-conscious. The question that now arises is how far this self-knowledge yields self-control, how far, that is to say, having gained this point of view, the Mind could not only forecast but shape its future. To answer this question we must turn from the development of thought to that of action.

CHAPTER IX

THE WILL IN DEVELOPMENT

One source of confusion in Ethical theory has been the close relation of distinct aspects of ethical life. Happiness, self-realisation, personality, the common good, virtue, duty, conscience, moral sense are all distinct conceptions, but they are not so readily to be assumed as independent factors in the life of man in society. They are terms expressing certain distinguishable elements in an ethical experience which is, after all, at bottom a unity. And in this unity all the relevant elements are closely interconnected. It is possible, accordingly, to start from any one of these conceptions and make it the centre of ethical theory, but in its further development such a theory has before it one of two alternatives, either to fall into hopeless one-sidedness or to take up into itself in bulk the content of theories that start from the remaining elements. Hence while different in form, ethical theories tend, as they fill out, to cover very nearly the same ground. On the theory of development this result is very readily intelligible. For, in the first place, the function of ethical theory is to harmonise a number of functions that have grown up in unconscious and incomplete, but nevertheless in real and fundamental relation to one another. In the second place, as ethical development consists in an evolving harmony of feeling and experience, the problem of theory is essentially to reconcile and not to exclude. It will, accordingly, now appear that each of the main types of ethical theory has its place in the evolutionary scheme. Happiness, for example, is the harmony of feeling with feeling and of feeling with experience, which is the general character of the good. Such a harmony, if attainable at all for the individual, is so only because the self is a potential system in which, by a duly proportioned development of each several element, a harmonious working of the whole is possible, and such a development is self-realisation in the strictest sense of that term. But, again, for the rational mind there can be no satisfaction in a harmony that anywhere involves fundamental discord. The rational impulse is an impulse to harmonise all that is susceptible of harmony, and that is the whole world of sentient mind. Hence, for the rational man there is no harmony within the self unless as a basis of harmony with other centres of experience and feeling, and the realisation of any one self is regarded only as an item in the development of society, that is in a Common Good. This development implies an ideal of Personality in which the moral virtues as well as the intellectual and physical excellences are constituent conditions, and the promotion of which, when it conflicts with any warring impulse or interest, is felt by the individual as a duty. Finally, the instinctive or quasi-instinctive promptings that urge us without reflection to the action generally necessary to such a harmony, form the content of the moral sense, and the summed-up judgment of present duty, in which elements of direct feeling and rational reflection blend in a final deliverance which *in foro interno* is felt to be supreme, is the reality to which the name of conscience has been given.

We have to follow briefly the development of this system of practical rationality in its point by point correspondence with the general evolution of mind.

1. *The Hereditary Factor.*

Of Ethical as of all conduct the primary psychophysical basis is hereditary. Nor is there a whit more difficulty in understanding the origin of social instincts—that is, of instincts tending to foster a common life and to ensure the maintenance of the species—than of instincts directed only to the maintenance of the individual. Whatever the source of variation in the first place, it is evident that variations of function tending to racial preservation would have an even better chance of survival than variations tending only to the preservation of the individual. Accordingly, from an early stage—indeed in a sense from the very lowest—heredity builds up structures, which in response, partly, perhaps, to internal changes, partly to definite outward stimuli, lead the individual to mate, to produce and perhaps make elementary provision for the young, and finally to consort in many cases with others of its kind. These instincts, on close examination, reveal the characteristic limitations, defects, and individual variations of structures that have been roughly shaped to their work by the indirect action of heredity. Thus, the infant mammal has an instinctive impulse which is satisfied by the sucking of the breast, but does not unfailingly and unaided lead it to find the breast. It follows its mother, but its initial impulse is often to follow any large slowly moving object. A hedgebird will feed the cuckoo that has expelled her own young, because she cannot resist the sight of a callow nestling and a bill gaping for worms. The fabric of instinct as a series of responses to stimuli is well seen in the cries, clucks, whistles that stir the mating instincts, warn the young or gather them around the mother to share the food. Every gregarious species depends largely on sounds of this kind, to which the response is highly uniform. But social life in the purely instinctive stage remains necessarily in a rudimentary condition. The hereditary apparatus of itself can do no more than provide certain typical forms of operation, and can neither advance to true parental care for the individual young nor from mere gregariousness[1] to genuine co-operation. In fact, behaviour testifying to regard for another as an individual is, I believe, confined to the types —mammalia, birds, and possibly the highest insects—among which there is independent evidence of intelligence at the level of that which has been described as the direct correlation of articulate experience.

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[1] Gregariousness proper is the mere tendency to consort, a tendency which has certain obvious advantages, *e.g.* warmth, the improved chance of sharing any find made by one individual, and, indirectly it may be, defence.

2. *Inarticulate Correlation. Feeling.*

It would be difficult to show that the social impulses undergo any substantial change in the lowest grade of intelligence, but there is one point to be remarked. In accordance with our general hypothesis it is at this stage that experienced feeling acquires decisive importance as a cause of subsequent action. It is under the influence of the attendant pleasure or pain that we suppose various modes of action to be built up, maintained, modified or annulled, and if this is so, feeling must become the pivotal point of behaviour. Indeed, instinctive acts also, so far as they are clearly distinct from the quasi-mechanical reflex, must be attended by satisfaction in all that prospers and forwards them, and by pain and distress in all that thwarts them, and there must, accordingly, from the first, be a broad correlation between the pleasurable and the life-giving, the painful and the unhealthy. It is probable that among the lower animals this correlation is closer than among ourselves. With us, two sources of discrepancy arise. (1) While the satisfaction of the organic cravings is generally pleasurable and failure to satisfy them painful, these cravings in the individual may be opposed to the higher functions which membership of the social organism or the mere energising of mental and spiritual activities may impose. In this case, the satisfaction of the organic impulse is a source of pain through the thwarting of another side of our nature. (2) What is a matter of greater difficulty at this stage is the existence of organic cravings which are intrinsically unhealthy, *e.g.* gluttony, alcoholism, etc. In general, these represent a hypertrophy of a normal impulse which is healthy enough, furthered by the reflective desire for the pleasurable excitement of stimulation, belonging to a higher stage of development. Man not being dependent merely upon instinct and being in some measure master of his life-conditions can, within limits, play fast and loose with himself without undergoing nature's penalty of extinction, and the existence of individuals with exaggerated, deficient or perverted impulses does not involve the destruction of the species. Pain itself as a source of nerve excitement may come to be an object of desire, and it is probable that the physical foundation of cruelty is the excitement of a perverted form of sympathy which the sight of another's pain produces. The mob that used to crowd to an execution and that still devours the newspaper accounts of a murder or gluts itself with details of the chase of a criminal, feels the thrill of the situation without the overwhelming physical or mental anguish which in direct personal suffering soon comes in to quell the hypertrophied lust of excitement. The interest that so many people take in punishment, and that they attribute to the fine development of their healthy moral indignation, is more accurately to be referred to an unconscious lust of a wholly morbid character—the perverted desire for an excitement which the suffering of others affords.[1]

Once again, then, we see how the rough and ready methods by which instinct is correlated with actual requirement, account, on the one hand, for the broad adaptation of organic pleasure and pain to the needs of health, and on the other, for the discrepancies which make morbid feeling possible and allow it to play its sinister part in human life.

3. *Articulate Correlation. Purpose.*

The impulsive act may spring from a feeling but is not directed to an end. Such direction becomes possible in proportion as the present experience becomes capable of suggesting an idea of that which is to come—an anticipation. Such an anticipation charged with feeling is a Desire (or Aversion if the feeling be of the opposite sign), and the action so determined is a purposive act, the content of the idea being the Purpose. With the formation of Purpose we cross the bridge which leads from the action of blind (though felt and conscious) impulse and enter the kingdom of Intelligence proper, and though the basis of the feeling which underlies the Purpose may be wholly instinctive, yet the purposive act will be justly ascribed to the conscious intelligence of the individual. It is correlated with its end, causes and is caused by it.

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[1] In detail these excitements depend for their satisfaction on much higher developments than those at present under consideration. But the point is that they have a basis in feeling of a morbid kind, whether congenital or acquired.

Just so far as it is intelligent the purposive act may also have ethical value. He who acts with a purpose 'knows what he is about,' and this is the first condition of praise or blame. At this point there are certain incidental confusions against which we should guard. In saying that a man or an animal 'knows what it is about' in doing this or that, we must be careful to understand what sort of knowledge we impute. To do this act A with this end B in view is to have a clear idea of B as a consequence of A. It is not necessarily to appreciate all the implications of the act. In particular, it does not imply the conscious application of a general principle, still less of any system of conduct. When a bird procures food for its young or a dog flies to the defence of his friend, we can justly praise the act because it is done with a purpose conforming to our standard of what is praiseworthy. We need not withhold our praise because we deny to the animal any apprehension of that standard as such. It is sufficient that it purposes the individual result of its individual act. But it may be asked, can we not at this rate go a step lower down and praise blind impulse too if it works out to effects which we hold good? The answer is that at the level of impulse the suggestions of praise and blame have no effect, and methods of punishment, if they effect anything, do so not by suggestion,[1] but by the quasi-mechanical influence of repeated experiences of pleasure and pain. For, where ideas of that which is not yet actual can be attached to the present, not only one, but two or more alternative ideas are possible. Choice between them arises, and praise and blame, suggestions of reward and punishment, can weight choice by charging one of two ideas with new elements of feeling. The domestic animals are in their degree susceptible to stimuli of this kind, and the way in which a sensible master treats them has its theoretic as well as its practical justification. In sum, with the emergence of ideas—though they be only ideas of immediate ends directly conjoined with present experience and serving as the term of some course of action arising out of such experience—there arise Desire, the conflict of desires, Choice, Purpose, and a function, and therefore a meaning, for the application of praise and blame—in a word, the elements of an ethical order.

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[1] Conversely, the chiding tone that checks a dog's impulse in full career operates through the suggestion of consequences, and a dog may be seen wavering between the two ends or seeking to carry out his congenital impulse while yet avoiding the results of his master's displeasure. It is of course conceivable that in any individual instance a tone or gesture should have acquired by assimilation direct inhibitory effect without suggesting consequences. Whether this explanation can in fact be applied to the successful and many-sided discipline of the higher domestic animals runs back into the question discussed above (Chap. V. p. 81). We are concerned here with the discrimination of stages as such, and our point is that true praise and blame conceived in their most elementary form as suggestive of reward or punishment operate through ideas, and are therefore appropriate only when ideas can influence action.

Assuming these conditions and no others, we have an order limited to the particular desires of the individual. In the absence of a higher being distributing praise and blame in accordance with a general rule, we have no instrument for the control of present desire, no guide as between conflicting desires standing above the needs of the moment or the wants of the individual, and so correlating present action with the requirements of life as a whole. We are dealing with individual feeling, and the main lines of such feeling are fixed by heredity. On the other hand, the sphere of experience is by this time considerably extended. Experience of results is more rapidly acquired and more freely applied. It can discover new sources of pleasure and pain and induce response to any regular training. We may suppose that the retriever experiences a satisfaction as real in bringing a dead bird to his master as he would in eating it up himself. Further, the more vivid and articulate character of experience builds up a true knowledge of the individuals by whom the agent is surrounded, and with knowledge, the instinctive impulses and feelings of affection, dislike, resentment, jealousy become focussed on individuals. The dog has its regular circle of friends towards whom its behaviour is graduated with some degree of nicety. One is its master, there are others whom it will follow, others, again, whom it greets with friendly recognition but no more, others whom it tolerates and others to whom it is hostile. The impulse-feelings on which social relations rest are, in fact, developed in the course of experience and take a variety of individual and concrete forms. The higher animals, therefore, are not merely gregarious, but are capable of the rudiments of family or social life. Parental care is, in all cases, well developed; whether to this is added the life of the herd depends mainly on the method of feeding, which in some cases gives an advantage to the gregarious type and in others makes it necessary to disperse.

4. *The Moral Law.*

From the present point of view—that of a comparison of successive stages in the organisation of life—the essential difference involved in the introduction of the rational factor is the formation of a traditional standard of conduct. Supposing no change at all in the primitive capacities of impulse-feeling, great things would, nevertheless, follow from the power to state in general terms the effect of an impulse, to give expression to the feelings which it excited in those whom it affected or in the onlooker, to distinguish its immediate from its remoter effects and so on. All this is done in effect as soon as class terms arise under which actions are arranged and to which terms of approval and disapproval are applied. There begins then to be a standard whereby action is judged, and this standard is neither the peculiar work nor the personal property of any single man. It is formed in the medium of language, grows up through the interaction of many minds, is handed on as a social tradition and once constituted brings the weight of an external force to bear on the promptings of individual feeling. In the result, action passes beyond the control of momentary desire. It is shaped by a rule of permanent efficacy and of impersonal character.

We have supposed this process to go forward without the aid of any wholly new feeling. But it may be doubted whether at one point such a feeling was not tacitly postulated in our account. We spoke of the feelings excited by an act in the onlooker, and the feeling of the onlooker is the psychological correlative of the generality, the impersonal character of the rule. Now it is quite possible that at a lower stage emotions might be aroused by the sight of suffering inflicted, but it is difficult to conceive that at this stage they would be distinguishable from the resentment inspired by any injury to a beloved object. Dispassionate emotion can only arise in proportion as the character of an act is distinguishable from the person who does or suffers from it. It is therefore apparently dependent on that measure of analysis which we have seen to underlie the formation of language and general conceptions. But it must also be noted as a new and specific development of feeling without which such conceptions would have no efficacy in ethics. It is, in fact, the basis of the pivotal ethical conception, the conception of Justice, and as the response of feeling to the elements of a rational order, we may speak of it as the rational feeling.

This feeling is sometimes identified with sympathy, and, indeed, they are not unrelated. Sympathy may be defined as the tendency to react to the feeling of another as though it were one's own. This tendency, in the purely unreflective stage, is determined by a pre-existing affection for the individual. It is extended in proportion as the realisation of the life of others enters clearly into one's own consciousness. With this realisation the feeling of another, though it is but an idea for me, is an idea of an experience charged with feeling, and the fundamental fact of sympathy is that in the absence of a counteracting cause the idea has the feeling-tone of its object. Such a counteracting cause, for example, is an emotional disposition of hatred or envy towards the person affected, which overwhelms the feeling of the object and makes the thought of pain a source of pleasure. In the absence of such a transmuting force, the object of the idea determines its feeling-tone in the mind in which it is formed, and a vivid representation of another's pleasure is pleasurable and that of his suffering painful.[1] The extension of sympathy then is conditioned by the limitation and suppression of counteracting emotions and by the extension of the imaginative realisation of the life of others. As this passes beyond the circle of the immediate objects of affection, sympathy begins to be dispassionate and supplies the humanitarian element in conduct. But as the history of human ethics shows, it is only by slow stages that it spreads from the circle of the kindred and the personal friends to that of the community, and from this again to the wider society, the human race and the sentient creation.

But though sympathy is one root of justice, it is not the only one. Primitive, like developed, justice concerns itself not only with the suffering of the sufferer but with the deed of the doer. It is the deed which is directly upheld or condemned, and the rule by which the verdict is determined is a part of the tradition by which the existing social fabric is maintained. What gives force to this tradition is the necessity of a social order as a condition not merely of the healthy life, but of the bare existence of human beings. In the maintenance of this fundamental condition of life, not one but all the living interests of human beings may be said to be concerned. Now this interdependence of the individual and the community to which he belongs is only realised in full at a late stage of reflection, but like other conditions of evolution it operates upon consciousness long before it becomes an object of consciousness. In the present case it operates through the formation of a social tradition, and we may conceive its operation as analogous to that of the environmental conditions in shaping the growth of an instinct. If we conceive a sentiment growing up which would forbid some course of conduct necessary to the maintenance of a given society or allow a course which would be fatal to it, it results that

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[1] The latter is by far the stronger motive. Sympathy with the pleasure of others is apt to be crossed by a morbid egoism which makes the happiness of others into a magnifying mirror of any cross in our own lot, and conversely, I am afraid we are the more ready to relieve the suffering of another because to do so exalts our own *ego*.

that society must, as a society, perish, or that a counter sentiment must arise in time to check the dissolution. Thus, the actual sentiments that prevail are roughly correlated with the needs of the social structure, though, maybe, without any conscious reflection on those needs. The one thought-factor that is indispensable is the universal judgment by which a rule is apprehended and applied. But a rule that is to be operative in action and to be sustained as a custom must awaken a response in feeling. Now particular rules will awaken particular sentiments, and, conversely, may be engendered by such sentiments. Among other things, it is easy to see that direct feeling for another individual, and particularly feeling for him based not on his personal relationship, but on his membership of the community, would be one very efficacious sentiment in the formation of such rules. But it would not be the only sentiment in operation. On a much larger scale, customs arise as the result of countless individual interactions of impulse and sentiment, interest and counter-interest, and in each case the rule once formed is supported, without regard to its particular character and effect, by a sentiment attaching to custom as custom and condemning its breach. This sentiment does not necessarily imply any clear appreciation of the social order, but it arises in response to the necessities of that order, just as other feelings arise in response to the necessities of life.

In trying to formulate the minimum psychological difference involved in the formation of general rules, we are thus forced to allow one new element of feeling—the sentiment supporting the rule itself. If all the grounds of this sentiment are set out, they involve the whole relation of the individual to society, the recognition of self and others as alike members of a body with rights and duties determined by that membership, and the admission that the life of such a body rests on the observance of general rules impartially applied. But here as elsewhere, feeling, sentiment, impulse arise first, the forces which engender them work in the background and are not made explicit as grounds of action till a later stage of developed reflection. The sentiment of loyalty to the established rule, the feeling that is shocked by a breach of custom, is the simplest form of the response of the individual to the call of social life. Now the individual can respond to the social order only by introducing elements of order into his own life. And while, once again, the nature of this order, the ideal of character or of duty, and the grounds on which it is based are late products of reflection, the direct feeling for the admitted rule is the first expression in consciousness of the forces making for that order within which matches the order without. The formation of such an order involves the correlation of different impulses and desires, restraining one, developing another, modifying a third, and the psychological reaction which supports it when challenged is not so much one feeling or sentiment co-ordinate with others, as an effect or precipitate of the entire mass of impulse-feelings that have been brought into a working synthesis. It implies, that is to say, that unity of feeling which constitutes the normal self, the practical side of which is that central control relating the particular act to the general lines of life which we call Will. For Will is the practical expression of system or relatedness as between different elements in active impulse, as reason is the theoretical expression of system or relatedness in the apprehension of experience, and Will is, accordingly, the response correlative to broad and comprehensive ends or to general principles of action, as desire is the response to particular ends. The psychological evolution then involved in the bare formation of human ethics may be conceived as the growth of a synthesis of the impulsive forces of our nature in response to the requirements of a social life. This organised body of impulses expresses itself in consciousness as the sense of obligation to admitted rules, and in action as the control of aberrant desires by will.

From the general conditions of human ethics we may now proceed to the phases of ethical development.

(1) *Custom.*

In ethical as in mental development generally we come in the ruder forms of life upon traces of a stage in which the distinctively ethical categories are imperfectly formed. In all known human societies, indeed, the simpler social rights and duties are in one way or another supported by customs which have at their back sentiments of an ethical character. Yet in the earlier stages there are many indications that what is distinctively ethical has not detached itself from elements of a different origin and character. We may take as the general conditions of an ethical judgment that it is (1) a judgment passed on the purposive acts of responsible individuals or on their character as tending to issue in such acts, and (2) an impartial judgment, which, whether explicitly or not, concerns itself with types of action in so far as they affect the general relations on which society is based, in so far as they affect others, and in so far as they affect the value of an individual as a member of society—a judgment imposing duties or asserting rights. Such elements are, of course, made explicit only at a reflective stage, but if our analysis is just a judgment is ethical which in the concrete conforms to them.

Now if we look at the lower grades of ethics we find that outside a small circle, very often, but not always, the kinsfolk, the primary rights of life, property and respect for sexual relations are generally recognised, but recognised in a peculiar form. A breach of these rights is not precisely a crime. It is rather an occasion for the recognised exercise of retaliation or atonement. To take the life, wife or property of one who is not a member of the kin, though he be a member of the same society, is essentially an act which will stir the resentment of the offended man and of his kin, and so lead to a quarrel. At the lowest stages even vengeance is not regulated or organised, and it is hardly possible to say that there is any regular method of securing redress. But even where redress by the strong arm and the help of the kinsfolk is well established and recognised, it is clear that such a check on transgression is not of strictly ethical character. The act that injures another and threatens social peace is not punished by any general rule impartially applied. In the same way and at bottom for the same reasons there is often a failure to distinguish intentional and unintentional action, and the vengeance of the blood feud often falls on the kin collectively or on any member of it in place of the individual wrong-doer. If the whole of primitive ethics were of this description we should have indeed to recognise in known and recorded social systems a stage at which the ethical judgment is not yet formed. In actual societies, however, there are many qualifying circumstances and in particular there are generally fields of conduct in which a more mature stage has been reached, and there are certain transgressions which are punished by such force as collective society can bring to bear (breaches of the marriage taboo and murder by witchcraft being the two offences that occur most frequently in this connection) and thus form the starting point of a true criminal law. There are, moreover, some peoples, including some of the very simplest jungle tribes, among whom rules of punishment seem to be unknown because crime hardly occurs, gentle, quiet peoples, to whom in their simple undifferentiated groups, custom appears to have acquired almost the force of instinct. I return later to the question raised by this phenomenon for the theory of development. More generally, though, on this point exact information is less readily obtainable, the mutual obligations of the kinsfolk may be regarded as true duties, genuine contents of a categorical imperative. It remains that over a large sphere of life, that in which many of the most elementary rights are conceived, the ethical judgment proper is imperfectly formed—at least imperfectly expressed in custom. The recognised code does not say 'Thou shalt not kill,' it says, 'If thou killest, expect the avenger of blood.'

All this no doubt is primarily a matter of social organisation rather than of moral psychology. The custom of self-redress belongs in the first instance rather to jurisprudence than to morals, but the old Adam is too strong among ourselves to allow us to doubt that the impartiality which is of the essence of the moral law is difficult to acquire and maintain. It has to be learnt by man and under certain conditions is too easily unlearnt. With this in mind we may fairly quote the customs of simpler peoples as indications of the way in which its rudiments were acquired. Furthermore, in the end ethical ideas work themselves out in the structure of law and custom, and the bond of custom in early society is quite strong enough to be a very real force even if there is no physical force to back it. The characteristic customs of retaliation and compensation prevail, we may be fairly sure, because on the whole they lie near to prevailing sentiment and this sentiment, which barely recognises obligations outside the community, admits them within the community but outside the inner circle just in the form and to the degree which the customs of redress express.

With this half-formed character of the ethical judgment the early conception of the moral sanction is in full accord. Primitive societies have their own theory of custom. They seek a reason for it in one of two directions. Generally the breach of custom brings a misfortune on the transgressor and those connected with him. Precisely how this misfortune operates it is not always easy to say, but in many cases it is clearly connected with the prevailing ideas of magic. In particular the magic power of the curse is an object of fear that may serve to justify the authority of father or elder brother, protect the poor from insult and gain the beggar a dole, keep property sacred from trespass and secure respect for the duly sworn oath. But such a sanction is no moral sanction. It is simply egoistic and prudential.[1] No doubt it embodies the workings of a real ethical feeling. When a man insults his father, jeers at a beggar or breaks his oath, he experiences an internal revulsion of feeling all the more violent in proportion to the *ὕβρις* of his initial act. In this mood he is ready to be filled with gloomy apprehensions, and in a condition to believe that any threat pregnant with evil will come true. But though the feeling is ethical the expression of it is prudential and, indeed, selfish, and it is with the expression that we are for the moment concerned. Looking at the expression of the ethical consciousness in the belief in misfortune following automatically on transgression, we may say then that it fails to render the ethical judgment (1) in that it gives an external and prudential reason for conduct which, morally considered, rests on quite other grounds, and (2) in that working automatically it takes no account of the character and psychological conditions, while often it is visited equally on the careless or purely innocent act, and falls vicariously on those connected with the actual agent.

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[1] When the calamity is one that falls on society as a whole, society as a whole protects itself by expelling or destroying the offender, and perhaps his relations with him. It is significant of the nature of early ethics that it is just at this point that the conception of a public wrong as against a private injury is first found.

Not only magic but primitive animism has its bearing on early custom. But here again we can distinguish a stage at which the operation of the spiritual world is in full harmony with the law of the blood feud. Poseidon avenges the blinding of the Cyclops in the true spirit of the avenger of blood. The rights and wrongs of the matter are nothing to him. That Polyphemus ate several of the companions of Odysseus and did his best to eat Odysseus himself is of no account. He pursues Odysseus from shore to shore, and blocks up the harbour of the Phaeacians who rescue him. The earlier spirits support their worshippers, protect their haunts and homes, punish their enemies. They are not impartial, supreme authorities, but simply unseen allies to be invoked, or enemies to be dreaded and repelled. We do not, then, in the lowest stages of religion find an explicit expression of the ethical consciousness, but rather a reflection of precisely those defects which we discovered in primitive law.

Upon the whole, then, if the ethical judgment be defined as one impartially upholding rights or imposing duties on responsible persons, it appears true to say that such a judgment is never wholly absent in any known society, but in many rude societies is in large measure unformed and imperfect. It issues in customs which in large measure are neither fully developed morality nor fully developed law.

(2) *Law and Morality.*

Early society emancipates itself from the limitations described principally through the growth of a central authority, which by slow degrees takes to itself the function of maintaining order, repressing aggression and retaliation with the equal firmness of the strong hand. Custom at this stage becomes definite law in the sense that it is formulated and enounced by authority and enforced by the executive power. It becomes 'the command of a Superior,' and at least in ideal it is impartially applied. It may be conceived that the development of an organ of impartial administration will forward the evolution of a corresponding sentiment. But whether political circumstances or improved ethical sentiment take the lead in bringing about the advance there is no difficulty in recognising the ethical equivalent of impartially administered law. It is simply the stage of the common moral sense which maintains a miscellaneous set of rules as binding on all persons concerned, which recognises in various men and women various rights, and enjoins on all a number of duties. Into the why and wherefore of these rights and duties it does not enquire. There they are. They constitute morality, and the breach of them is as such immoral. There is nothing here of the hypothetical character of the law of vengeance. Whatever their source, the moral laws have a validity which does not depend on retaliation, and is not confined to the weak. The moral law is now as impartial as the king's law endeavours to be. Yet in the face of temptation the moral law must have something to say. The reasons for conforming to it, at other times neglected, must at length come into the foreground, and at the present stage these are of two kinds. There are the temporal penalties attaching to the breach of public law, and there are spiritual penalties attaching to every breach of the moral law, seen or unseen of men. These spiritual penalties may take the form of misfortune in this life, or of punishment after death, whether by reincarnation in the form of a loathsome animal or by being cast into hell. Their points of agreement and difference from the punishments of magic and animism are equally instructive. Like them they are non-moral in that they base the motives of conduct not on the inherent ethical consequences of action, but on external and prudential considerations. Unlike them they are so far ethical that they are applied in general by the impartial judgment of a just God, and fall accordingly on the offender alone, and on him only so far as his sin is deliberate and unrepented.

This common-sense morality which underlies all the higher religions and philosophies, then, is closely analogous in its successes and its failures to the thought which we also attribute to common sense. It gets on very well until it is asked for reasons. Its rules are felt as rules of morality, as something to which the conscious intelligent being is bound, the breach of which cannot therefore be visited on anyone but the deliberate offender. They are for the same reason impartial. They may, indeed, be very unequal, but that is a different matter. The rights of A or B may differ widely, but whatever they are C is bound to respect both alike. A may have privileges which B has not, but be his privileges great or small, A, like B, must keep within them. The common-sense moral judgment is in this sense as impartial as it is categorical. These are distinctive features of the ethical judgment, and it is only when we reach the grounds of the judgment that the relapse occurs. The absence of thought-out ethical grounds forces us back upon an unethical mechanism of extraneous rewards and punishments.

We have said that this incompletely-ethical view is very persistent. But in all the higher civilisations the content as well as the form of the ethical judgment is greatly modified by the reflective systems of ethico-religious teaching with which it is overlaid. If we would know what sort of ethical order common sense elaborates for itself we must hark back to the early civilisations and to the barbarian ancestors of civilised society.[1] These codes, of course, differ very greatly in detail. For our purposes it is sufficient to remark that they are founded on and serve to maintain the group-organisation of society, which they carry to greater perfection and further elaboration than the ethics of the first stage. Group organisation becomes a system of peace and, on the whole, co-operation as between the members of a certain body, combined with indifference and even hostility to those without this body. This combination dominates both the stages which have been described.

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[1] Though these are in fact still heavily weighted with the ethics of the feud.

But (1) in the simplest forms of society what is effective is the inner group, generally the kinsfolk, who will stand by one another for purposes of mutual defence. As society advances, the relations of different groups come under more regular control, generally by the growth of the chieftainship, and though self-redress is only suppressed by slow steps, there arises gradually a certain order in a society resting on other elements than either the tie of blood or mutual fear. (2) In the simplest societies there are only the distinctions between the inner group, which stands solid,[1] and the rest of the community, who enjoy equal 'rights,' and between the community and outsiders who in principle have no rights at all. These divisions become complicated in the growth of society with distinctions of class and rank and of rights in accordance therewith. There are elements of antagonism from which the simpler communities were free. The class tends now to form a new sort of group within the community. Within it rights are equal and the inferior has fewer rights and perhaps, if he is a captured enemy or bought slave, none at all. All that here need be insisted on is that throughout the group-formation dominates ethics and law. Man must be loyal, honourable, just in his dealings with his own. As to others—that is another matter. He must, moreover, be ready to fight for himself and his own—and against all else. There is wheel within wheel, group within group—family, kindred, trade or profession, class or caste, the community as a whole. There arise many groups and many loyalties and many degrees of legitimate enmity. But as a whole the life of common-sense ethics is a life of blended co-operation and hostility, of justice and aggression, of love and hate, of self-surrender and self-assertion. All these elements are written deep in the code of common sense, in the personal character that it admires and the system of law that it supports, and if the origin of this code lies in early times, does it need anything but the bare description of it to show that, however much overlaid and held in check by a higher law, it persists to the highest stage which civilisation has yet reached? The ethical judgment is there, but its meaning is not ascertained, and it is allowed to flout itself through mazes of contradiction.

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[1] In some of the very simplest the community does not appear to exceed the limits of what is elsewhere an inner group, so that even this distinction fails.

(3) *Idealism and Religion.*

Before logical analysis has displayed the contradictions of common-sense ethics the insight of prophets and seers has penetrated the web, and had sight of a deeper truth. A succession of gifted men, or indeed several schools of such men, working in their different ways in Greece, Palestine, India and China, seize for the first time the nature of certain of the fundamental conditions that underlie the life of the individual and his relations to his fellows. They reach down to the life of the soul and the spiritual order, in which the relation of soul to soul is the unitary fact. In form their teaching for the most part is an exposition not merely of the nature of man, but of the being of God or of the laws of existence. In this respect it is largely determined by the general intellectual level of their time, the prevailing interpretation of nature, scientific or metaphysical. But they have certain things in common, whether they work from a theistic basis, like the Hebrew prophet and the Christian Apostle, from a metaphysical conception, like the Buddhist, or with a more directly social interest, like the Confucian. Their mission is to interpret the essential nature of spiritual life, and in carrying it out they may justly be said to cut down to a deeper order of reality underlying the world of common sense, just as the reality of science or metaphysics underlies the world of common perception. Henceforward on the ethico-religious as on the cognitive side there are two orders—the order that is natural and the order that is spiritual, the order in which the plain man lives and the order which the higher teaching reveals.[1] In essentials what they report to us of this order may be put in a very broad way as follows. It is the source of that element in common-sense ethics that makes for harmony and co-operation. The stuff of which it is formed—the tissue of the spiritual world—is Love, and from this tissue is woven an ideal of personal character and, in dependence thereon, of social relationships. Of this ideal the suppression of self, and of all that makes for self-assertion, is the warp, as universal benevolence is the woof. Where God is the centre of the whole design, God Himself, at first, as with the Hebrews, the source of righteousness and authority, becomes, as in Christianity, the concrete expression of Love itself, and the relation of the self to God sums up and includes the relation to all other conscious beings. All the characteristics of group-morality, its virtues of pride and group-patriotism, its antagonisms, its denial of equal justice fall away. The spiritual order allows no such discord. Its peace and goodwill are for all, and it thus lays the basis of a co-operation and a harmony of all mankind. Lastly, the motive which it propounds is no longer some extraneous consequence, but, whether it be the love of God, the perfection of self, or the power of self-surrender, always some inherent characteristic of the spiritual order.

While revealing profound and fundamental truths which may as justly be termed true scientific discoveries as any which physical science can boast, this teaching has its limitations and its liabilities to error. Essentially a matter of insight rather than of reasoning, its truths are partial rather than complete, and where it seeks to cover the whole field of knowledge and action it does so rather by deduction from conceived positions than by the patient reconstruction of reality through the piecemeal interpretation of experience. In the support of its central position, which rapidly becomes crystallised in dogmas, it postulates Faith, and Faith comes to replace Love as the keystone of the arch, and so to distort the whole ethical edifice. Moreover, its appreciation of spiritual truth, being obtained rather by penetrating insight into certain aspects than by the resolute effort of reason to grasp the whole, is partial and one-sided. In particular, in insisting on self-surrender it is apt to ignore the claims of self-development, and in dwelling on Love to pay less attention to justice. In holding before the individual the way to obtain peace with his own soul it has less regard for the collective life of humanity, and has little concern for the possibilities of true social progress upon earth. It tends to foster rather than to overcome the antithesis between the world of the flesh and the world of the spirit, and while confident that the one world only is true and real, has practically to abandon the attempt to incorporate the other within it. In the result it either acquiesces in the division of the spiritual and temporal power, or to maintain the form of supremacy explains away its own fundamental teaching. Its comparative failure in practice is therefore not to be attributed solely to the hardness of heart of the sons of men, but equally to its inherent limitations.

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[1] At bottom this holds true even of a purely ethical teaching like that of Confucius, since the life that it postulates makes a demand on human nature, which, though less exacting than that of Buddhism or Christianity, will only be met through a special discipline, and in its fullness only by a gifted character.

(4) *Realism.*

These limitations point to the need for a more fundamental reconstruction. The world of ethical thought and practice, the fabric of social institutions in which thought and practice are crystallised, has to be treated as the world of knowledge is treated. It has to be dug out to its foundations and built over again. We have to get down to the true ethical meanings, the judgments of value which incorporate themselves in rules of action, in ideals of life and forms of social structure, trace them to their generating conditions, and combine them into an order which lends rational significance to the impulse of life as a whole. Such is the avowed task of ethical philosophy, alike in the Greek and in the modern world.

Abstract reasoning cannot indeed play the same part in this practical reconstruction as in the world of knowledge.

There is needed an impulse from the actual craving of souls and bodies left figuratively or literally starved by the deficiences of the recognised social order. There is needed the sensitiveness of the sympathetic imagination to lay bare the palpitating fibres hidden and too often bruised and crushed under the weight of the social fabric. Hence, particularly in modern times, we often find the most concrete and insistent statement of the problem not in philosophy but in a social or national movement, or, again, in the literary delineation of life as it really is in contrast to the pictures of life which the unreflective social tradition has built up. The true realism of art and literature—and every creative mind is at its best realistic—may be conceived as dealing with a problem very similar in its essentials to the problem of science. Here, on the one hand, is the web woven by society—the mass of existing institutions, marriage, property, the established religions, the current morality, the recognised ideas and sentiments to which all good men are supposed to subscribe. Conventional art accepts this order in disorder, romantic art idealises it. Realistic art has a higher and more difficult task to perform, and it is no wonder if it seldom yields that completeness of aesthetic satisfaction which comes from the contemplation of a nicely rounded whole. Against this screen of traditionally built sentiment it holds up the real man and woman, it seeks to pierce to the heart of their life, to show them as they truly are, and to display the interaction of those underlying forces with the social tissue in which they find themselves enmeshed. It is true that human forces—forces such as these very men and women whom the artist seeks imaginatively to realise—have fashioned this network. But fashioned as it is by man, it by no means covers the whole of human needs or expresses the full possibilities of human life. It is just the particular compromise of impulse with conditions which the jostling of a myriad of forces happens to have brought about. Not but that wisdom, insight, statesmanship have gone to the making of it. Without these no accommodation were possible at all. But their part has been to make the best adjustment possible with circumstances. They have not yet overcome the conditions or made themselves master of the material in which they work. To put the same point in another way, society, though consisting of conscious and intelligent units, is not thereby constituted a conscious whole. On the contrary, the interaction of the units, each with his own seemingly clear purpose, is ever at work producing situations which no one plans. Not only so, but the mass of custom from which law and ethics take their start grows out of an indefinite number of acts, in each of which the individual was conscious only of his immediate end, and had no concern with the social institution which he was all the time building up. But such an institution once formed becomes for action and, indeed, for thought itself a habit, a fixed groove, a category by which henceforward experience will be judged, by which thought will be directed and action confined. It is not till the fabric of custom has been formed that ideals of life take their rise, and so they come into existence confronted, so to say, not with an unweighted experience which they might dispassionately judge, but with man and society as they have been formed by generations of unconscious growth. Hence at the outset the *milieu* dominates the ideal itself, even when it is an ideal of revolt. The social fabric, with its strange organic power of adaptability, absorbs the independent thought, sucks it into its tissue, digests it and emerges very slightly modified by that which was going to revolutionise it. The ideal so digested becomes a convention, and in the end little more than a form of words out of which all the blood has been sucked, and it is perhaps serving the best function of which it remains capable when it stimulates the realist to his task of holding up life as it is as against life as it is decked out with convention and smothered in tradition.

(5) *The Social Principle in Ethics.*

The realism of art may thus be said to state the problem of which it is the business of philosophy to find the general solution. To this problem the work of ancient philosophy made two great contributions. In the first place, it found a general solution of the problem of the relation of the individual and society. It arrived (with some qualifications, it is true) at the conception that the antithesis between the social and the personal is fundamentally false, and that the true antithesis is between the higher and fuller self which is social, which needs social relations for its content, its filling, and the lower self, which seeks individual satisfaction. This solution has been in substance taken up into modern thought and compared with the idea of selfhood, which the religions suggest has the great merit of placing the conception of personal development in the foreground and putting self-surrender and negation in its right place as a means to the fuller development of self or others. For the same reasons it has the further merit of bringing out the social side of virtue, and insisting on justice as the pivot of the practical life.

In estimating the value of this contribution we must keep in mind a point which tells both on the credit and the debit side. The Greek thinkers were not working with the developed thought of a spiritual religion before them. Greek philosophy was not an endeavour to take rational account of such a religion and work it into the sum of human experience. On the contrary, for the Greeks such a religion lay not in the past but in the future, and their method of approach to it was mainly through philosophic enquiry. They were working up to the fundamental truths, not working on them as conceptions already familiar. Hence the comparative simplicity of their problem and the relative success and completeness as compared with modern systems of their handling. They grasped a smaller range of experience, and held it therefore with a firmer grip.

But in the second place, as Greek ethics advanced thinkers became more aware of the relativity of their entire standpoint. It became increasingly clear that the city-state was not the only form of human association nor the last word of development. The necessity of a more absolute standard appeared, such as would appeal to the individual in the absence, or perhaps in defiance, of positive state law or generally accepted custom. The Greeks formulated the conception of such a standard in the conception of Nature as that which is valid everywhere and is unalterable by human agreement, and in the law of Nature they arrived on the side of ethics and jurisprudence at fundamental truths parallel to those of the religious consciousness, and asserted Universalism on a different and more logical ground. But though it formulated the conception of an absolute standard from which the actual constitution of society has departed, the idea of Nature contained ambiguities which, as became apparent when it was revived in modern thought, rendered it a dangerous instrument in the reconstruction of social ethics. What was needed was a systematic exposition of the nature of the judgment of value which, if it was to reorganise society, must lead up to and culminate in a comprehensive conception of the meaning and purpose of human life.

(6) *The Reconstruction of Idealism.*

But in the interval between Greek and modern civilisation Christianity had absorbed the energies of Europe, and had saturated the social and ethical domains of thought. The stream of Christian development represented a union of Greek rationalism with Oriental mysticism, but in all but its highest expressions it tended to maintain the separateness of the spiritual and material order, nor at best is it free to criticise its own presuppositions and to revise them in the light of the actual needs of human life. Its function is not to discover how life can best be organised so that humanity can make the most of itself, but assuming that it has possession of that which is best, to see how humanity can be made to conform to its rule. Now the concern of modern rationalism—in this linked closely with the Greek—is precisely with human life, its needs and its possibilities, individual and collective. The spiritual truths of the world religions are among the leading data of its problem, but they are truths that have to be disengaged from a historical setting which can no longer maintain itself. Stripped of this historical framework, they are seen as truths concerning the soul of man, the position of man in the world, the relations of man to man, and so the fundamental life of society. But whether they are whole truths or part truths is another question, and one which the religions that taught them could not impartially investigate. So the whole problem of life had to be taken up anew, but it could not be taken up precisely where the ancient thinkers had left it. It had been complicated by the deeper conflicts opened up by the fuller religious experience which the world had lived through. For under the influence of religious idealism moral laws acquired a sanctity and an absoluteness which they never possessed on the common sense plane. They were touched, we may venture to say, with that same breath of the Infinite which all through distinguishes modern from classical modes of thought. To adjust their claims to the actual conditions of social life involved a reconstruction alike of ethics and religion which could only be effected by investing social life itself with the same infinitude of meaning.[1]

The relations of the individual and society no doubt are still the pivot on which controversies turn. But the problem is not merely to reconcile their interests. The individual is now a potential centre of resistance, not necessarily on selfish but on the highest ethical grounds. The claims of conscience on the one hand, the order and welfare of society on the other, contend for his obedience. Even to fulfil his own personality may be as much a man's duty as his right. He has become the subject of more than one allegiance, and in virtue of one or other of these may have claims upon society as legitimate as the claims of society upon him. Indeed, there is a sense in which the personal life is more fundamental than the social. For in the instincts, the needs, the impulses of the personality are implicit all the strands that connect the individual with the whole life of mind, whereas in the actual fabric of society wherein he is called to play his part the requirements of the spiritual order may be very imperfectly met. If in one sense society is clearly greater than the individual, there is another sense in which the individual may stand above society, and any reconciliation of personal and social claims must reckon with this relation. The problem then is so to conceive the heightened claims of personality as to make them not disruptive of the social order but working constituents of social harmony.

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[1] A single illustration may suffice. No ancient thinker would have hesitated to sanction infanticide as the solution of a sufficiently acute population problem. To the religious mind this solution is barred by the sanctity of parental love and of the new-born life. Modern rationalism would admit this sanctity as one of the conditions of true human development, but cannot, as the religious spirit may, refuse to consider the problem of reconciling it with other conditions equally sacred. It can find a solution only if it can show how to maintain parental responsibility at full power while joining to it responsibility for parenthood to society.

In the solution of this problem the question of personal liberty takes the central place. Nor will it be personal liberty alone, but liberty for all the forms of social life or combined efforts which arise spontaneously out of the special relations of men that will need consideration. To put it shortly, the synthesis now required is one which will harmonise not merely individual with social interests, but a many-sided freedom, social and personal, with an orderly and disciplined co-operation. In such a synthesis the idea of Development is the keystone. For the implication of liberty is that the error, the wrong and the discord which it renders possible are the price of truth, character and co-operation. In the end we get nearer to truth by letting error develop its fallacies than by stifling it at birth. From beginning to end we develop character not by sheer coercion, but by self-conquest and the knowledge—or rather the full imaginative realisation—of the meaning of good and evil. We approach assured social co-operation not by compelling obedience, but by winning assent. In fine, those things which we ourselves hold true and right and socially just we know for partial truths which will gain in the end by the contest with their rivals in the open. But these considerations have weight only when we conceive the social order as a stage or a process of development, and that a development of a spiritual or rational kind. If it were merely a question of realising immediate good as it appears to us, coercion would always be in place. Liberty has its value only in a far longer game.

(7) Now modern thought, as has been said, is concerned with the idea of liberty from the first, but its implications only emerge by degrees. The general problem of modern ethics is to bring spiritual truth into relation with the actual conditions of the development of humanity. In terms of social philosophy this is to achieve the synthesis of freedom and social co-operation, and in the effort to do so we may distinguish three main phases, the first centring on the conception of Nature, the second on that of Happiness, and the third on that of Development.

The idea of Nature descended from antiquity, but, like all ancient ideas, it changed its concrete meaning with time. Nature meant for the eighteenth century philosopher that which would remain if human institutions were in idea swept away. Into this conception he unwittingly imported his own highly developed ideas of right and justice, and the human individual was conceived as seised of rights and possessed of moral qualities which are in reality the outcome of social history. There was in consequence a blending of truth and falsity in the conception. It was true in so far as it conceived human nature as larger in its potentialities than anything which the social fabric had expressed. It was true in so far as it conceived the individual as subject to a higher court of appeal than the judgment of any given society. It was sound in method in that it stated the social problem not merely as a question of identifying personal interest with public utility, but of reconciling the private conscience with public law. It was wrong in so far as it detached the social from the personal life, set liberty in opposition to order, and treated the rights of individuals as limiting conditions rather than as constituent elements of social co-operation.

In this respect the Greatest Happiness Principle reversed its teaching. It reduced rights and duties, liberty and authority, alike to the position of means to an end, and it set up in the conception of Pleasure and the mitigation of pain a standard of value which it took to be scientifically measurable without dependence on any current ideas or traditions about right and wrong. Here we come to a definite demand for the thorough-going reconstitution of human institutions on the basis of an intelligible theory of value. But the theory itself was open to criticism from two points of view. On the one hand, it supplied no adequate account of the ethical motives which it postulated, and arguing that Happiness alone was desirable, it yet pleaded with the individual to sacrifice his own happiness if necessary for that of the greater number, and could overcome the contradiction only by a supposed development of sympathetic feeling which carried little conviction. On the other side, in taking Happiness apart from the fullness and harmony of life on which it depends, it introduced a certain unreality and a certain narrowness into its ideal. It failed to satisfy the deep-seated conviction that man—not only the individual, but the race—has a function to perform, a part to play in things, and that even if the race as a whole could be happy without performing this function yet something essential would be missed.

This conviction is asserted in the biological conception of the expansion of life, the increasing fullness of vitality as expressing at once the direction in which the organic world moves and the goal at which rational man should aim. Unfortunately this conception, being based on physical laws and not on ethical analysis, is generally presented in a form which fails to differentiate the aims of man from those of the tiger and the wolf. The idea of development has received a more human treatment both at the hands of Idealism and of Positivism. In spite of profound differences we have in both these methods of approach the fundamental conception of the human spirit working towards the fulfilment of its own being, evolving out of its cravings and to meet its necessities the institutions and creeds of successive societies, but freely modifying them in its advance to match the deeper needs of a fuller and more conscious life. The ethical order is the product of a spiritual principle working in human life. This principle seeks, as the ablest of the Idealistic writers teach, to realise itself. It is not complete here and now, but is something in process, in effort. Operating in every individual it moves to the fulfilment of personality, but operating alike in all individuals the development that it seeks must be self-consistent or harmonious, and it is as the condition of such development that liberty acquires its full, positive and social meaning. Lastly, as fulfilment of effort satisfies, the result if not the direct aim of this development is the general happiness.

Indeed, if happiness be rightly defined as consisting in harmony of life, the divergence from the Utilitarian teaching is less marked than appears at first sight. We shall see in the next Part that the Practical Reason must be defined as an impulse to establish Harmony in the world of Feeling, and that this world comprehends all sentient beings, reducing differences of person to a secondary place. Harmony will be seen to imply a relation of mutual support or furtherance, and to be realised in several relations. There is what we know familiarly as pleasure, a harmony of feeling with the environment. Certain conditions yield pleasure, and the pleasure prompts us to maintain or reinstate such conditions. There is again a harmony of feeling with feeling, and such a harmony, where the environment does not conflict with it, is happiness. Lastly, there is a harmony between our feelings and those of others with whom our lives are in contact. This harmony is a part of the rational order and the basis of any Happiness which can be called general. Accordingly, (*a*) it is true to describe the ethical end as Universal Happiness. But (*b*) we do not experience either pleasure or happiness in the abstract. We have pleasure in the exercise of our powers, physical, mental, emotional, or generally in the fullness of life. We have happiness in so far as this exercise is in harmony with itself, so that if there is to be a harmony of feeling running through the world of mind, there must be a corresponding harmony of life. General happiness would be possible in lives so lived but in no other, as any other is, so far as it is effective, self-destructive. Happiness, then, has as its content a life of a fullness conditioned by harmony. (*c*) But harmony, we have remarked, means mutual support or furtherance. Two or more functions or forms of life are in harmony so far as they tend to maintain and further one another. Hence, in so far as feeling harmonises with impulse it tends to strengthen that impulse, and, similarly, all sides of personality are thus increased in scope and intensity so far as they harmonise. At the same time insistence on harmony, that is the practical reason, aims at extirpating whatever it cannot reconcile with a harmonious order. Harmony tends to fullness of life, to complete development of personality, though it also limits this development in any individual by the condition that his activity must be such as to promote the development of others. Thus a harmonious development of man in society forms the one aspect of the ethical ideal as the universal happiness forms the other, the two being related as the content of feeling to feeling itself. Both those who have insisted on happiness and those who have insisted on self-realisation have expressed the truth, though it would seem in each case with too much emphasis on one side. The harmonious development of Mind is at once the substance of general happiness and the end of rational action.

Thus in modern thought the problem of the relations between the individual and society breaks up into several distinct but related problems. On the one hand there are the rights and duties of the individual giving occasion for internal conflict. On the other hand there is the contrast between the actual social order and the true conditions of social welfare, and this contrast necessarily complicates the resulting problem, which is that of the mutual claims of the individual and society. In general the solution to which modern thought has tended lies in the conception of the ethical order as a realisable harmony of many-sided development. Rights are essentially conditions of development, duties are conditions of harmony, so that both are elements in social welfare as fully understood, while the actual fabric of society is a partial or experimental approach to the order required. The realisation of such an order would involve the full development of personal capacity, and such development, when shared in common partnership, is the substance of a noble and happy life. The furtherance of such a life has a claim on man through that element in his nature which we may call, indifferently, rational or spiritual.

(8) The validity of this claim will be briefly examined in Part II. Chapter II. Here we lay stress only on the fact of the clear emergence in modern thought of the conception of the ethical system—and with it religious belief and social institutions are bound up—as the creation of human impulses and as the servant of human needs. Modern ethics does not, as has sometimes been held, render the State subordinate to the individual. What it does is to subordinate the State system, and indeed the entire mass of traditionary regulation of life, to the needs of life itself, but the life that it contemplates is that of all humanity. Just as on the side of cognition so here the fabric of traditional thought grows up uncritically under the stress of social actions and reactions. Religious idealism holds up against this tradition a higher ethical order, but still without reasoned demonstration. The critical stage, beginning with the demand for a standard of value, culminates in the conception of the entire ethical order as emerging historically from the structure of mind as it grows in society, and subject rationally to the ascertainable conditions of the mind's development. Here again, as in the spiritual religions, the motive is inherent in the nature of the moral order. But it is more fully impersonal than before, the value of conduct lying not in that which the individual attains for himself, but mainly in his service to the greater whole to which he belongs. But the more ethics is freed from religious dogma as an external authority or sanction the more evident it becomes that the ethical order must itself acquire the full force of a religious appeal. To fill our place, to play our part in the moving life of the world with all the ardour, devotion and self-sacrifice that that may entail becomes the supreme religious duty. The sense of that life as something exceedingly simple and very close to us in its essence and yet remote and vast in the sweep of its all-embracing order and movement becomes the content of the religious thought. It is indeed impossible to speak of modern religion with the detach-

ment of the historical spirit, for it is all in the making, and it is rather propounding a question than laying down a solution. But certain points appear distinctive. In the first place, the religious order must make its account with experience. In spite of all efforts to escape, in spite of a hundred abortive flights through loopholes of irrationalism and mysticism, religious thought is in its inner consciousness aware that in the end it must abide by reason or perish. In the last resort accordingly it falls back from mythology, from faith, and from intuition on experience. But that is at once to place the actual spiritual experience of mankind in the foreground of religion. The historical forms become secondary. They are reduced to so many incarnations, each infected with the spirit of its day, of the substance which is just all that is noblest in the life of mind. The problem of religion then comes to be to determine what is noblest, and to ask how it has come to be and what it has in it to be. The old order is inverted. What is good and worthy and worshipful, instead of being derivative from an assumed law of creation, become data from which the meaning of life can be inferred and the content of a religious order filled in. If in an earlier phase the moral law was derived from and based on religion, it would be truer now to say that the moral consciousness is one of the starting-points and strongholds of religious belief. Whereas aforetime ethics had to conform to religious prescriptions, it would now be widely felt that religious conceptions must conform to ethical requirements as verified in human experience. As a consequence the whole ethico-religious sphere is enlarged. It does not become less personal. Indeed its hold on personality deepens in proportion as it is realised that for each man its value depends on the spontaneous response of his whole nature. But it recognises social salvation as the greater, and including personal salvation within it, and it finds in justice, or what is right in the relation of man to man, a higher spiritual achievement than any virtue of the soul in which the individual can wrap himself in moral warmth.

Lastly, in proportion as the spiritual order is defined in terms of experience its points of contrast with the order of reality become impossible to ignore. The moral indifference of nature forces itself upon us, and it becomes evident that the real as such is not spiritual nor the creation of anything which is purely spiritual, just, or good in our human sense. Reality then is not spiritual, but the spiritual is an element in Reality. It is, moreover, if our account of development is just, an element which grows and gathers strength as it attains unity and clearness of purpose. If this is so, we may say that from a Being or Law from which humanity has woefully turned aside the spiritual becomes a life or a principle which is coming into force through humanity, giving unity and rationality to the toil of human beings and through the life of man to the whole world-process that leads up to and supports his life. More briefly the Spiritual may be defined as the moving force in ethical development. As such it is an object of positive knowledge, and the entire stream of orthogenic evolution is the revelation of certain phases of its growth.

Ethico-religious progress is not continuous, but we can recognise the principal steps by which the idea of a spiritual order has been attained, purified, enlarged and brought into relation to ethical experience. Nor is the advance continuous in the domain of ethics proper. But it is untrue to say that there have been no discoveries in the ethical field. On the contrary, there have been four such discoveries of capital importance leading mankind through the stages here distinguished. The first is the establishment of the impartial rule, the foundation of common-sense morality. The second is the establishment of the principle of universalism, the foundation of religious idealism. The third is the social personality (if we may use a modern phrase to express the real centre of the Greek doctrine), which governs the first stage of philosophic ethics. The fourth is the idea of Freedom, as the basis alike of personal development and social co-operation which emerges in the modern reconstruction of ethico-religious idealism. But broader and deeper than any definite ‘ discovery ’ is the subtle and penetrative change effected by ‘ reconstruction ’ as a whole, which transforms rights and duties from restrictive laws into constituent conditions of the desirable life, and though it leaves morality the master of man makes it the servant of humanity. These discoveries find their ultimate meaning in the conception of a spiritual order not imposed on humanity from without, but growing up within, and directed, through the control of mechanical conditions and by the development of its own many-sided activities, to the fulfilment of the vital capacities of the race. The development of thought, which renders the mind of the race self-conscious, is completed by the development of will, which renders it self-determining.

CHAPTER X

DEVELOPMENT IN THE CONCRETE

1. We have traced the advance of thought by itself. But it does not proceed by itself. Both as cause and effect it is correlated with every side of human activity and experience. As cause, because the advance of thought gives fresh power over the environment, suggests new ideals and formulates new methods of social organisation. As effect, because the basis of thought—even of the ideals in which imagination seems to have the freest range—is in reality experience. The most Utopian dream starts from experience, and in proportion as it recedes from experience becomes shadowy and in the end meaningless. Thought in social affairs is not indeed bound close to the realised and the actual. Still it is tethered to it by a rope which gives it a certain play but confines it to ineffectual struggles if it seeks to wander too far.

Properly to understand the development of mind then we must attempt a very summary view of the corresponding stages in the growth of human achievement in general, of the social structure, the arts and industry. Unfortunately a summary view of social development is more easily imagined than attained. The extreme complexity of the subject, the bewildering mass of cultural data which with all its wealth leaves gaps and blanks where information is most necessary, the difficulties of interpretation and the absence of admitted standards of comparison combine to make the measurement of social progress an exceedingly difficult task. Let us, however, seek to appreciate the general character of the evidence and the possible method of dealing with it. The comparative study of culture has as its data first the life of our own world on its manifold sides, its philosophy, science, literature, religion, its laws and customs, its economic structure, its political system, all that we call Western civilisation. Next, still keeping to the contemporary world, there are the old civilisations of the East, and, representing still older levels of culture, the semi-civilised, barbarous and savage communities whose independent life is fading into the past. Thus in the present alone there is an immense field for comparison, but the comparative study of the present could throw little light on development if we knew nothing of the past. To the investigation of present conditions then we have to add a history which for our ancestors extends over about two thousand years, and traces them to a stage of barbarism broadly analogous with some of the lower social types of our own day; while for our civilisation we have a much longer record, extending back through Greece and Rome to the beginnings of Babylonian and Egyptian civilisation in the fourth millennium before Christ. Lastly, where history ends or where it leaves gaps and faults in its record, we help ourselves as best we can with the indirect evidence of archaeology, and with its aid we trace the story of culture, more dimly, indeed, yet still with sufficient light on certain fundamental points, to an epoch so remote that in comparison the whole span of recorded history becomes short.

What emerges from these data? If history had that full continuity for which some writers have contended the answer ought not to be very difficult. The prehistoric movement would be given us by the combined study of archaeology and of contemporary savages. This would lead us to the dawn of civilisation, and from that time onwards the record itself should inform us. But the matter is not so simple as this. In a certain broad sense human evolution may be one process, as indeed all organic evolution may be one process. But if so, it is a unity made up of a thousand different processes—processes, moreover, which, particularly in their lower stages, are not merely independent but largely antagonistic to one another. Just as organic evolution is a generalised process made up of the evolution of countless separate species going on partly, no doubt, in occult underlying sympathy with one another but also largely in overt and strenuous antagonism, so also the development of humanity is the summary of the movements of distinct centres, every community, every group, one may even say, every idea, having a life of its own which has its own peculiarities and distinguishable internal causes. We are not to exaggerate this independence; there is also everywhere (unless in circumstances of exceptional geographical isolation among primitive peoples) widespread intercommunication, direct and indirect, with much mutual influence of ideas, arts and institutions, and such intercommunication grows, and its growth is even one of the measures of human development. But if human history grows towards a unity, its roots are in diversity and down to our own time its advance is not simple and unitary but proceeds in many centres, none wholly independent, none without some self-propulsion and idiosyncracy. We ourselves owe our civilisation not to the barbarians of the Teutonic forest, but to Roman, Greek and Jew from whom they learnt. There is a thread of continuity running through all historic culture, but it is crossed and recrossed by many another thread, and the result is at first sight a tangle rather than a neatly woven tissue of clear pattern.

In this tangle we have already traced one thread, the development of thought, a development which is not, indeed, continuous, but which, because its results are most effectively handed on through the generations, proceeds on the whole more surely and more regularly than any other collective effort of mankind. With thought and knowledge we may rank the control of physical conditions as their immediate result—so immediate, indeed, as in the absence of written records to be the best measure of the degree of knowledge actually attained by a people. Now if we take knowledge and the material arts as a provisional basis of classification, and with this in our minds survey the field described above, we find a vast range of variation presented by peoples still inhabiting the earth. Without going backward in time we can pass from our own aeroplanes and wireless telegraphy to Australians, Fuegians and Veddas, whose life is almost entirely dependent on the caprices of nature. Between these extremes we can place a series of barbaric and semi-civilised peoples of the present day together with the civilisations of recorded history. Beyond the confines of history we find remains testifying at first to a level commensurate with contemporary barbarism, but descending, as we go still further back into the palaeolithic age, to a level even below that of the rudest living savages.

On this side, then, the general drift of human evolution is sufficiently clear. Yet even on this side it is not a straightforward continuous movement. The material culture of classical antiquity was in large measure destroyed in the fall of the Roman Empire, and it was not till the later Middle Ages that all the lost ground was made good. Nor is it probable that this is the only break which a full investigation would disclose. If we speak, then, of a tendency or a progress towards the growth of knowledge and the increased command of nature we must not think of this as an automatic process, as a 'law' of progress which must inevitably effect itself. It is something dependent on a variety of conditions any of which may work against it and arrest it. It does not, so to say, represent a straight line to which the movement of humanity is confined and along which it is always marching. All we can say is that, with whatever halts and back turnings, it is a direction in which humanity, or a large part of it, has actually moved a very considerable distance, and is at present moving with greatly increased velocity.

When we pass to other sides of social life these considerations become still more important. It is rarely, if ever, that we can say of any institution or any order of ideas or of activity that its growth can be traced as a continuous process from its first beginnings to its present form. Normally we find a series of actions and reactions, and must be more than content if we can find in the upshot some definite result indicating a net movement in some distinct direction. Take, for example, the position of women. We conceive of the equality of the sexes and the freedom of women as one of the distinctive ideas of modern times, and it is not uncommon to hear the position of women spoken of as one of the tests of general civilisation. If this were so, and if progress were continuous and were something that affected the life of society all round, the inference would be that the study of history would reveal a continuous advance in the position of women from slavery to equality. This view will not stand the most cursory examination of the data. Among the historical peoples the position of women has more than once been far higher in many important respects than it was in the times of our fathers, and among savages it is by no means uniformly low. It is, in fact, affected by other causes than the general level of culture, and at certain stages the advance of culture has probably affected it injuriously. Take, again, political freedom. It is an ideal towards which the modern world is still striving. It was in large measure realised by Greece and Rome and the mediaeval city. True, if we look deeper we find that freedom for us has a fuller meaning and a larger scope. It is not to be denied that there are essential differences between a modern and an ancient democracy. But in the interval between them it would be true to say that there were periods when the idea of political freedom was dead. By no stretch of imagination could we represent the measure of political freedom to which the modern world has attained as something towards which the art of government has moved by successive steps all pointing in the same direction. The most that we can say in these and countless similar cases is that, when we consider the life of humanity as a whole and compare our own civilisation with the whole series of earlier forms, together with their survivals at the present day, there appears, when all actions and reactions are set against one another, a certain net movement.

Now if we take social life on its many different sides and consider the development of each, it is quite possible that we shall find a broad coincidence in the net movement, along with great variation in the steps by which that net movement is achieved. But for our purpose, which is that of appreciating the actual result of social evolution up to the present time, the net movement is of primary importance. Now this movement has already been set forth on the side of thought, and we have already seen a certain correspondence between speculative and practical ways of thinking. What we have now to do is to consider whether the net movement on other sides of social life exhibits any correspondence with this dual development.

(2) We would preface this enquiry by disclaiming any exaggerated estimate of the primacy of thought in human life. Thought is not an independent agent, disposing as she will of human passions and directing personal or collective purposes. She emerges within the range of the passions, first defining their needs and pointing the means of satisfaction, then correlating their action, bringing them into subordination or co-ordination, eventually harmonising them within the individual and as between individuals in such wise that they acquire some unity of purpose, and life, personal and social, becomes a relatively coherent whole. All the time the function of thought is itself profoundly influenced by the elements among which it works. It is stimulated or checked, cowed, silenced, by fears or interests which it touches; again excited and exalted by emotional springs of hope. Its advance is an effect as well as cause of moral and social progress, but in both relations it serves as a measure. Hence we may expect a certain correlation between the advance of thought and the other achievements of mankind, but we must not expect the correlation to exhibit anything resembling the simplicity of unconditional causal correlation. The factors of social life are many and it may and does often happen that what we should rightly reckon as an advance in one respect has reactions of the most unfortunate kind on other sides of life, as the development of machinery, so great a step in the necessary subordination of nature to man, depressed the working classes for a couple of generations and served the arts of destruction as well as those of happiness and peace.

It will, however, be convenient to begin with those sides of human activity in which the direct influence of thought and knowledge is most apparent, and observe the correlation of broad stages of advance. In the development of thought we distinguished four phases, in the first of which we supposed general ideas to be in process of formation, leading up to a second stage in which they become sufficiently definite to form the elements of that which we call the common sense order. In the third, they were so analysed and interconnected as to establish conceptual systems, deductive sciences, physical and metaphysical theories, leading to the fourth stage, the critical reconstruction of experience which we hold to be the problem of thought in our own times. With these we may compare the most remarkable steps in the advance of human control over inanimate nature and the consequent power of man to supply his physical needs.

We have first a stage in which man is almost entirely dependent on that which nature offers him for his support. His tools and weapons are of flint, bone and wood. If of metal it is of metal in the pure state requiring no smelting. His dwellings are caves or at best wind-breaks and the rudest huts. His clothing is non-existent or composed of skins and furs sewn with bone needles and animal sinews. His food is obtained mainly by hunting and fishing. He has tamed the dog to assist him in hunting, but has no regular live stock.[1] He has no knowledge of health and disease, but imputes natural death to witchcraft. His powers of counting are small, and though he can draw and carve, he has no writing. At most he may here and there use pictographs to communicate certain information, and perhaps certain signs by way of memoranda.[2] The only exception to his general dependence on natural supplies is his power to light a fire, the origin of which is still the subject of guesses rather than of any scientific certainty.

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[1] 'Magdalenian' man would seem also to have driven the reindeer (see Sollas, *Ancient Hunters*, p. 347).

[2] Marks of unknown meaning which may have served these purposes are not uncommon among Upper Palaeolithic remains (*Ibid.* pp. 243, 312, etc.).

Such in rough outline is the culture of the lowest hunting races, now becoming extinct, and, so far as the available evidence enables us to judge, of the Palaeolithic Age. Its broad characteristic is the use of the gifts of Nature with the minimum of transformation. The improved implements of the Upper Palaeolithic levels appear to mark the beginnings of more specialised industries, each with its definite rule-of-thumb tradition. The transition to the Neolithic Age is the result of their maturity. Smoothly polished implements come very largely into use. Spinning and weaving become regular arts, the use of earthenware is general, boats are built, and, according to the character of the environment, society becomes either pastoral, and increasingly rich in flocks and herds, or agricultural, and settled in permanent habitations, often—especially if the Joint Family system develops—of considerable size. Such is the general character of contemporary barbarism so far as it is not influenced by contact with a higher culture, and such appears to have been the condition of the more advanced peoples in the period between the close of the Ice Age and the beginnings of recorded history. The beginning of a third stage is marked by the introduction of writing and by the use of metal, and the two improvements together, taking place in the fertile river valleys, or introduced there by immigrants, aid in the formation of settled states of some extent and population. Writing is still ideographic in the earliest Egyptian dynasties, now referred to the middle of the fourth millennium B.C., but in the Babylonian region the Sumerian script had lost its pictorial form before B.C. 3400. Though iron is found in Egyptian tombs of the first dynasty, it did not come into general use for thousands of years. Both the Sumerians and Egyptians are at first copper-using people. Bronze comes later—it is rare before the twelfth dynasty—and the Egyptians do not appear to have used iron habitually till the seventh century. Gold work, hammered wire and soldering are found in the first dynasty tombs, and copper was cast as early as the fourth dynasty. The introduction of metal into Crete is referred to about B.C. 2800, and iron appears from B.C. 1200. Glazed pottery beads are found in the prehistoric Egyptian remains, but glassy matter by itself is not earlier than the eighteenth dynasty. Conjoint irrigation works began in Egypt with the earliest dynasty, and the Bahr Yusuf was in working order for 300 miles in the fourth dynasty. Elaborate systems of drainage have been found in the 'Minoan' palaces of Crete, and on many early Sumerian sites. These discoveries are the more remarkable, as sanitation of the kind appears to have completely died out, and it is said that the Minoan system was not again equalled till the middle of the nineteenth century A.D. Oxen were used for ploughing in Egypt from early times, but the horse and chariot were introduced by the Hyksos, and men are not depicted riding until the New Kingdom. The shadoof was early in use, but the water wheel does not seem to be verified before the Ptolemaic period. No siege engines are shown in Egyptian monuments, but from the eighth century we see towers raised against besieged cities.

No epoch-making advance was effected in the industrial arts by the Greeks or Romans.[1] Yet Archimedes is credited with the discovery of forty machines, including the compound pulley, the screw pump, and the endless screw, while the Romans had cause to remember his inventions in the art of war. Hero of Alexandria was the first man of eminence who systematically applied science to invention; but though he made the first steam engine, was familiar with the expansion of air by heat, and constructed mechanisms in which motion was produced thereby, his contrivances were rather scientific toys than machines of practical utility, and this side of his work was sterile till it was taken up again in the Renaissance. Meanwhile the mariner's compass was introduced into Europe from the East—it was known to the Chinese at least as early as the second century B.C.—and the possession of this guide made long sea voyages possible, and led to the discovery of the new world. Chemistry, originating as a practical art in Egypt, had elaborated methods of experiment—*e.g.* distillation as a means of separating substances was known from the fourth or fifth century A.D. Lastly, to mention only one more point, clocks known to the Greeks in the shape of the clepsydra and the sandglass had developed into weight-driven machines needing only the experiments of Huyghens with the pendulum to perfect them as time measurers. Thus on the one side the more apparent natural forces have been brought into the service of man, wind and water are used to drive mills, animal strength is freely utilised, rivers are canalised, land is irrigated, and fertility maintained by some rotation of crops. On the other hand, many artificial substances are empirically discovered and brought into use—from bronze to glass, and from iron to the elixirs and potions of the older pharmacopœia. All the elementary machines, the wheel, pulley, lever and screw, are in use.

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[1] This may be regarded as the chief discrepancy in our correlation. The development of conceptual thought may, I think, be truly referred for its beginning to the invention of writing and the larger constructive works of early civilisation as sketched above. But it took thousands of years to come to fruition and even then its effect on the mechanical arts was small as compared with the magnitude of its achievements in its own domain. The cause is partly inherent in the nature of the conceptual interest at this stage, which tended rather to divert attention from detail and from practical applications; partly, it lies in the slave system, which gave a supply of cheap labour, even cheap skilled labour, which diminished that need of mechanical substitutes which operates so prominently with us.

Such, roughly, is the state of man's control over nature in the later Middle Age. But in the middle of the thirteenth century began a series of capital inventions which prepared the way for a new epoch. Gunpowder (thirteenth century) transforms the art of war. Printing from movable blocks (fifteenth century) revolutionises knowledge. The discovery of the microscope and telescope (early seventeenth century) opens up new worlds. The barometer (seventeenth century) and the thermometer (1700) lay the foundations of accurate measurement. There follows on the industrial side the discovery of the smelting of iron with coal (eighteenth century), and then comes the steam engine and the great series of textile inventions which created Lancashire and revolutionised England. These inventions introduce us to a fourth stage in the relations of man to nature.

The discovery of the microscope and telescope reveal new worlds, the development of mathematics a new instrument, the systematic interrogation of experience a new basis. We get below the surface properties of matter, and appreciate and utilise the energies which they conceal. Without seeking to determine the question of the ultimate validity of the conceptions of physics, we may fairly assume that they stand for a genuine advance in insight into the real working of things, and that as the microscope gives us genuine knowledge of a world beyond the ken of the senses on which many of the most important events of our lives depend, so similarly the conception of molecular processes expresses a reality of which chemistry and physics make use, and so, further, the ultra-molecular processes to which the most recent science points, represent again, however inadequately, a further stage in the grasp of reality. The characteristic of the industrial stage in which we live is that industry, following science, goes below phenomena and utilises the unseen forces of nature in engineering, chemistry, medicine and hygiene for the purposes of man. Industrially this stage is marked with some historical definiteness as beginning towards the middle of the eighteenth century. Some of the leading inventions which made it possible go back, as has been shown, to the Middle Ages and even to Greek science, but it was not till this period that they began to take full effect. In the earlier inventions, again, the wit of the 'practical' man was still the principal agent, but more and more as development has proceeded has this latest industrial phase come to deserve the name of the stage of Applied Science, and of the control of the underlying forces of nature.

We may perhaps best succeed in fixing the leading characteristics of these stages by considering the materials used by man in each, the motor forces employed, and the methods by which food is won. Thus in the first stage the chief implements are adaptations of materials half formed by nature for the use to which they are put—the chipping of flint, the pointing of bones, the scraping, cutting and stitching of skins and so forth. For power man relies on his own right arm, and for food he goes direct to the products of nature. Beyond this he hardly advances before the close of the Palaeolithic period. In the next stage we may take the potter's art as typical. A wholly formless material is shaped by man to his ends, and with the shaping of the clay vessel we may compare the spinning and weaving which transform fabrics into thread and thread into cloth. Animal power is added to man's, and food is obtained by the breeding of animals and the cultivation of the soil—in both cases by using not merely the products of nature but the productive powers of nature. In the third stage the materials are themselves in part artificial, though their discovery is sporadic and empirical. The great apparent forces of nature, wind and water, are brought into use by mechanical appliances, and similar appliances enable human and animal power to be transformed in kind and direction. Agriculture begins to be intensive, natural fertility is increased, its lack even is made good by manures, and natural species are improved by breeding and grafting. In the fourth stage substances may be disintegrated and reconstructed from their elements. Molecular and ultra-molecular forces—vapour tension, electrical attraction and repulsion, chemical affinity—are brought within the comprehension and, finally, within the service of man. Chemistry, bacteriology and the science of heredity are being applied to the systematic production of the best forms of plant and animal in their most perfect condition, and the synthetic production of foodstuffs is a further result which it is not unreasonable to anticipate. From the use of the overt, massive forces of ' phenomena ' we are passing to the control of the underlying and elementary conditions of movement and life.

3. The control of the environment is one of the two great channels through which the influence of Mental Developments affects the entire social structure. The other great channel is that of the ethico-religious outlook. In ethical development we have distinguished the stage of primeval custom, of moral common sense, of ethical idealism and of realistic humanitarianism. The centre of

the development is the idea of humanity in its two meanings—the humanity which is in each of us, and the humanity which is all of us. In the first two stages this principle is operative but unconscious. In the third it is explicitly affirmed in various forms of idealistic teaching. In the fourth it is correlated with the conditions of development, personal and social. Now religious development is a web of which knowledge and ethics are the warp and the woof. It is the progressive apprehension of the spiritual element in the world. Its leading moments, as here conceived, have been shortly stated or implied in the account of intellectual and ethical development, and the results may be summarised in a few sentences. In its lowest phase the spiritual, while gradually emerging as an idea out of primitive emotions and quasi-instinctive practices, remains as an idea wholly confused with the material, the unintelligent and even the bestial. It is the stage of animism, of stone worship, beast worship, of the binding of spirits by magic incantations and charms, of cajolements and threats intermingled with petitions. In the second stage the spirit stands out as a clearly recognised personality. It is anthropomorphic, human and even superhuman. In the third stage it embodies the ethical and intellectual ideal. Ethically it is the Perfect God, all righteousness, all love, the source and fountain of human ethics. Intellectually it is the Absolute, the Infinite, even the whole of Reality. These attributes are, in fact, irreconcilable, but the upshot of a dispassionate criticism of experience is that, though Spirit is not the whole of things nor their unconditioned creator, it is a dynamic force in things, and a force which progressively enlarges its borders. From being the eternal and immutable basis of order, the spiritual becomes the moving impulse towards that highest order, which may be called the harmony of life, and the evolution of humanity is the revelation of certain phases of its growth.

4. With the advance of ethico-religious ideas the development of the imaginative representation of life is closely linked. For in the deeper and more subtle issues

of life abstract thought never satisfies, and we approach the concrete truth by flashes of insight, by emotional suggestion, by constructions embodying meanings which it is hard to state in explicit terms. Imagination, like all thought, is in part an expression of experience, in part a construction for which experience supplies material and suggestions. Hence its work at any stage reflects the extent to which and the methods by which at that stage experience is held together, and corresponds accordingly to the movement of thought in general. Thus the lowest grades of art reflect the incoherence of ideas. Its stories, generally centred in some magical or animistic ceremonial which they 'explain,' are rambling and disconnected. Its attempts at the figure are childish.[1] Conversely, the clear-cut concrete ideas of ‘ common sense ’ are reflected in the life-like bas-reliefs and statues of early Oriental art, and in the sagas and ballad poetry of Scandinavian, Hebrew or early Greek. Here is life as it is, or stories of life as it has been handed down from mother to child and borrowing a certain heroic proportion from the dimness of antiquity. But though there may be infinite beauty of expression, there is not yet idealism in the strict sense of the term. The ‘ constructions ’ of this stage are either monsters or magnified men. The third, Idealistic or Romantic stage of art, sets up an explicit cult of the beautiful in life, whether in outward form or in action. It deals with the heroic type, the hero, the saint, the perfect knight or the gentle, lovely, beneficent and virtuous lady, and it admits the ugly, which it also idealises, only for the sake of contrast. This is the typical art, of which the Classic and Romantic are only subordinate species. It is as much the art of Sophocles as of Scott. It is the imaginative expression of the ‘ conceptual reconstruction,’ the stage in which the mind moves freely and happily in an order of its own creation. Beyond it, again, lies the art of Realism, which treats the ideal itself as a work of human hands and the Real as something greater than humanity, by which all things are to be judged. In its interpretation of life it has something of the cool detachment of science, and it teaches only by showing how things actually work. It is the art of the Experiential Reconstruction, and as such it regards the ideals of man not as patterns laid up in heaven, but as expressions—imperfect but not necessarily unworthy or unfruitful of human effort and human hopes. In its criticism it uses satire, and sometimes falls into cynicism. But cynicism is not the truth but the failure of Realism, which in essence is founded on a sympathy with the life of man that is wide enough to love the kind for its weaknesses. Of such realism it is perhaps fair to consider Euripides as the founder, but its wider development is modern, and it is the requirement of realism which has made the novel the dominant form of modern literature, as that which gives readiest scope for the display of the working forces of life in their full extent.

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[1] But we have to admit a very remarkable exception of which no adequate explanation has yet been attempted. Within certain limits some very primitive peoples have achieved a really high form of art. In general culture, the Bushmen rank almost at the bottom of existing or nearly extinct peoples. Judged by their implements, men of the Upper Palaeolithic rank clearly below the Neolithic. Yet the Bushmen could draw and paint in a life-like fashion of which races standing far higher are incapable, while some of the animal drawings and carvings of 'Aurignacian' and 'Magdalenian' men have a force and spirit which puts them not only far above any Neolithic achievement, but in the judgment of many above the achievements of early Oriental art, and even, according to some enthusiasts, on a level with those of the Greeks. It must be admitted that though simple scenes can be made out, most of the 'Aurignacian' drawings are as wholes of very confused and incoherent character, different figures, very life-like in themselves, being thrown as it were pell-mell on to the rock, and that the 'Magdalenian' work is only one step further on in this respect. It is also true that their real success is limited to certain animal forms, the presentation of the human figure being defective, and, in the case of women for the most part grotesquely (perhaps intentionally) hideous. It also mitigates our sense of miracle to find that the highest achievements were the result of a long development, from crude beginnings in the early 'Aurignacian' period through the middle and later 'Aurignacian' into the early and middle 'Magdalenian.' It remains that at what is to all appearance a very low general level of development there has in certain cases arisen a sense of line and form, together with a power of execution, which altogether disappear at a higher stage. A 'Magdalenian' artist would have smiled, or wept, over the tame lions that adorn some of our public places (Compare Professor Sollas's *Ancient Hunters*, for many reproductions of Aurignacian art, Chap. VIII.; for comparison with the Bushmen, Chap. IX.; and for Magdalenian art, Chap. XI.; for the development through the Aurignacian to the Magdalenian periods, see Osborne *Old Stone Age*, Chapters IV. and V.).

But as a pendant to the realistic interpretation of experience, the mind needs a free range into the beyond, and in proportion as it becomes conscious of the fact that in this range it is transcending the limits of actual knowledge, it needs a vehicle for the expression of those feelings which cannot be formulated without falsity, but which as feelings are driving and impelling forces. It must find a voice for the pathos of limitation and frustration and withal of persistent underlying hope, for 'infinite passion and the pain of finite hearts that yearn.' Such a voice has been found in music. It is to be heard in the modern lyric. The same revolt against human finitude, the same longing for hints and suggestions of a beyond that is known to be unknown inspires the interpretation of nature, whether in poetry or in painting. These, the characteristic modern arts, are not themselves realistic, but constitute those methods of transcending experience which realism sanctions. We may therefore take the critical attitude towards ideals which the term conveys as the characteristic of the most advanced phase of art.

The development of artistic representation does not imply advance in the power to make beautiful things. Beauty is something complete in itself and insusceptible of progress. Everyone would admit that there are passages of the *Iliad* and verses in *Genesis* which are perfect, and where there is perfection there can be no progress. On the contrary, the perfect may be a cause of decay since it inspires second-hand imitation, and, generally speaking, an art languishes when that which it has to render has been expressed as well as it can be expressed, until a new genius or a fresh experience opens up a new line. It is probably from this cause rather than from fluctuations in the supply of natural ability that the fortunes of art fluctuate so strangely. The creator is a miner in unknown depths. When he strikes a vein he not only gets a rich return for himself, but is rapidly followed by others, who crowd to share the spoil. Work goes more and more merrily as hands increase and the wealth of the deposit is explored, but by degrees the best is carried away, the vein peters out and a few nuggets at most remain for the late-comers. All is dull till a new lode is struck, that is to say, till new experiences open out or new methods of interpretation are suggested. Nor does the new art at its best give us greater beauty than the old, but a fuller interpretation of experience, with a deeper and more truthful expression of feeling.

A certain congruity in the development of science and philosophy, industry and economics, religion and ethics, literature and art, is to be expected, since they are all expressions of mind; very diverse expressions it is true, but still utterances of the same fundamental need. These developments are classed here among the social because essentially, and without any disrespect for the great creative individuals, they arise in the intercourse of minds and all in some degree and some in very high degree are the outcome of generations of effort. We have yet to deal with the social in its more customary sense of the institutional fabric which sustains all these activities, and the lives of men and women as conditioned thereby. To consider how far this structure reflects in its development the general movement of thought will be the task of the next Chapter.

CHAPTER XI

MIND AND THE SOCIAL FABRIC

1. When we turn to the development of the social structure we enter upon a field where the forces at work are predominantly mental and yet the controlling power of mind seems in general to stand at its lowest level (so much so that deterministic views of social life and history, some of them eliminating mind altogether, have often been held to constitute the only ‘ scientific ’ basis for the interpretation of society). The explanation of this paradox is very simple. Social life is predominantly mental in the sense that it expresses the relations of thinking, sentient, craving creatures, who as animals are of course subject to biological and mechanical laws, but who act and react on their physical surroundings and more particularly on one another in strife or co-operation, love or hate, in accordance with impulses belonging to them as minds. The social tissue is the web of human impulses, but it is a web and in some parts or under some aspects a tangle rather than a woven pattern. It is the product of innumerable minds throughout the generations rather than the plan of a single mind with a clear purpose of its own, and though co-ordinated activity and clear-sighted purpose have played their part and human life would be a sorry affair without them, yet they are rather factors struggling for existence on their own account in the sea of contending passions than controlling principles based broadly on comprehensive understanding of social needs, and though there is, as we shall presently argue, an advance in the degree of control exerted by mind, it is matched and it would some-

times seem out-matched, by the advancing complexity of the social problems which the very development of mind brings about through the extension of intercourse, the greater amplitude and variety of life and the implications of industrial changes. Even the deeper requirements of social development are in some of their phases opposed to one another and are reconciled only with effort and in the face of serious difficulty. Hence in advancing in one direction, society often loses ground in another. Society itself, that is as distinguished from any particular form of its organisation, may fairly be regarded as 'natural'; it springs from the direct need that men have of one another; the needs that belong to sex and parenthood, the need of someone to love, even of someone to hate, someone to lean on or to protect, to work with, play with, compete with, fight with, the physical necessities of mutual protection and the advantages of mutual aid. The very egoism of man is social. It needs other men as the field of its display. But just because social life is thus based not on a simple and definitely social impulse, but so much more broadly on the whole life of man, it also reflects the whole complexity of human nature and the narrower, harder, exclusive, competitive and dominating impulses as well as those which make directly for human co-operation. In social relations we press, even press hardly, upon one another. Seeking our own, we turn other men to our uses, treating them 'not as ends but as means merely.' In the effort to enlarge our sphere we cabin and confine them, yet we also, perhaps unwittingly, stimulate and consciously or unconsciously succour and support. Factors making for harmony and co-operation are blended with the fears, jealousies, rivalries and ambitions which are their very opposites. The simple need of human fellowship and the correlative sense of its elementary obligations which in Locke's phrase makes 'a bargain of truck between two men in Soldania, or between a Swiss and an Indian in the woods of America,' as binding as if they were under the rule of law, has never sufficed to constitute a society of mankind or even to assure bare tolerance and mutual respect between man and man as such. For it has had all the host of human passions to contend with, from the hatreds of rival lovers who know each other only too well to the suspicions of strangers who fear because they do not know one another at all, and quarrel where they do not understand. It must enlist some of these forces on its side and reduce the strength of others before it can make headway. The growth of kindreds on the basis of sexual and parental interests illustrates the one progress; familiar intercourse with neighbours, the mutual understanding based on similarity of habits and ideas and the frequent need of co-operation, illustrate the manner in which suspicion and fear are overcome. By the operation of such factors as these, mankind attains its first effective social organisation in groups. Among the simplest peoples such groups are generally small, sometimes very small and relatively homogeneous. By closer inter-relation, fusion, conquest, or mere natural growth, larger communities are formed, and with the increasing output of human energy, enter on a many-sided life with growing diversities of rank, wealth, power and function. The internal growth of each social unit, the relations of one unit to another and the elements of culture in which they participate or diverge, constitute the field of social development.

2. The formation of a stable group involves the establishment of a set of traditions, generally accepted as governing the main relations of its members in regard to sex, parentage, property and personal protection, and therewith certain common ideas of the unseen environing forces in life and the proper way of dealing with them. This network of tradition makes men relatively safe in living together and in dealing with one another. They know what to expect of one another, and if wrong is done there is still a right way of dealing with it. It is by this means that fear and suspicion are kept in check and personal animosities prevented on the whole from submerging the little society. Indeed, to run social life on these lines, where everyone has been born and bred in the same system and is perhaps personally known, both himself and his

forebears, to everyone else, is a comparatively simple matter making no great call on native ability or on accumulated knowledge or expert skill. The problem of living together on such terms is relatively simple and not beyond the capacities of untutored man to solve.[1]

Starting from the simplest groups of this kind, as we may find them among the Vedda, the Kubu, the Andamanese or some of the Australian aborigines, we may ask in what does social development consist? Broadly we must identify it with a larger and more effectual co-operation of expanding human energies, for this means the fuller expression of the social principle proper. This movement takes more than one form and here it is that conflict appears. The simplest and most obvious form of such enlargement is, literally, increase in the area of regular and peaceful social relationships. The simplest groups, we have seen, are very small, and though there is usually a good deal of intercourse beyond their bounds and the mutual hostility of groups has been greatly exaggerated, the limits of the organised structure wherein a man can reckon on a place and within which he may look for countenance and support, remain narrow. By various methods, increase of numbers, intermarriage, conquest and assimilation, these become enlarged as we mount the scale. The little local group or the kindred which are the true units of social organisation at the lowest economic levels are generally parts of a tribe which at that stage has a very ill-defined unity. A little higher in the scale the tribe acquires organisation and then it is either fused with other tribes by intermarriage or subdues them or possibly by natural increase enlarges its borders. Thus by very different methods the tribal area becomes a district in a larger unit—a city state, or a petty kingdom—and among these again similar processes of extension go forward. Great super-national empires, extensive federal or quasi-federal communities are formed. At the same time some partial organisation is introduced into relations between communities and finally in our own time the pressing dangers of anarchy in this relation have led to the first tentative efforts at a world league.

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[1] Hence, as remarked above, many of these peoples live a peaceful and untroubled social life. They can be described in terms that seem almost to depict a social ideal. Yet we rightly think of them as standing on a low stage of social development. Energy, passion, and initiative bring their problems and as long as these are unsolved, disturb social life and torment humanity. Yet the path of development is not back to the stagnation in which they have not emerged, but forward to the synthesis in which they co-operate. The peaceful jungle tribe may be much happier than a civilised nation burdened with class conflicts and the recurrence of war. In the same way animals may be happier than men. In this simple life which, at its best, is no doubt free from many causes of strife and suffering, the entrance of energy and initiative means differentiation, conflict, probably ascendency and repression. This second stage is less happy than the first, and if man could never get beyond it it would be better that he should never have entered it. But it does contain the elements essential to the larger and fuller harmony and therefore it represents development. The study of social development is the review of these expanding efforts, their conflicts and the endeavour of man to reconcile them.

It should be added here that there is no sufficient evidence that the peaceful life of some very primitive groups is the typical condition of early man. These groups exist under certain conditions and may be the product of a long evolution adapting them to such conditions. They survive by sheer inoffensiveness to more powerful neighbours and because they possess nothing to stir covetousness. Many very simple peoples are also quite familiar with quarrels and vengeance. War as an organised business of communities is of course later, but to show that war is not primitive is quite a different thing from showing that peace is primitive.

The advance is not indeed straightforward. We cannot establish a simple and universal correlation between intellectual development and the extension of the community for there are certain factors as we shall see in a moment which work in the opposite direction. But, these apart, the relation holds, and in the end we review a progress, not unbroken but constantly renewed, from the petty group of two score of individuals to the incipient federation of the world.

3. The extension of the community is, as we shall see, closely related to its structure, but we may begin by considering structure on its own account.

We must remark first that the structure of the community, like any other structure, may be close and compact or loose and relatively feeble. The tribe of very simple peoples is a unity of a kind, but very loose-jointed ; often it has no common organ of government and takes no collective action for the protection of its members, either against wrong-doers within or aggression from without. At the other end of the scale, the British Empire, though a recognisable unity, is again a loose aggregate in which the elements of a common life are uncertain and almost incalculable, while it consists of communities, many of which have a vigorous and vital unity. When we are considering extension of area we must take these differences into account. Most of the extensive empires of history have been loose-jointed and it may be taken as certain that any world state would have to be a union of communities which, at any rate for a long time to come, would be more stable and effective than the whole which they may constitute. Indeed any well-knit group is an obstacle to extension unless by its own conquests, but conquest has serious reactions on group structure, to which we shall very soon come. We already see that we have touched upon one of the conflicts involved in social progress, and that there is real difficulty in reconciling effective unity with extension of scale. But to keep for the moment to the question of structure, the little group of primitives, when closely knit, have the kind of unity that we may call solidarity. The members of a clan, for instance, are bound to mutual protection, often own their land in common, and sometimes share its produce. There is very little scope for the individual and beyond the differences of age and sex there is very little differentiation, no ranks, no slaves, in many groups no chief even of any definite power. The organisation is efficient, as far as size permits, for the purposes of mutual protection and internal peace, but not for industrial advance or other collective achievement. The advance of knowledge and its applications brings greater efficiency in these relations, but also entails social divisions, industrial differentiation, military order, the growth of authority, often the subjugation of conquered peoples, and the emergence of distinct classes and great differences of wealth and position. The growth of efficiency, the power of man over nature, and over his fellows, with the capacity to organise and so achieve large collective ends, is the second great factor in the development of society, and we can see that this factor again is only purchased at a cost. Differentiation at its best is adverse to the full realisation of personality. A man is more than a function, yet to perform any function well he has to give the greater part of his working hours to it and to narrow himself as efficiency increases. This is a difficulty which remains for the most democratic society at present an imperfectly solved problem. But in its development efficiency has cost the world still more, for the main differentiation which it requires is between the director and the executant, and this too easily takes the form of division between master and man, lord and serf, and when efficiency takes militant form and secures extension by conquests, these differences widen out and the distance between the great king and his subject becomes vast. We begin indeed to see a saving grace in that weakness of great aggregates which from the point of view of the extension of social order alone we might deplore, and to feel that the truer conception of the value of life has often been on the side of the smaller peoples who resist absorption. It would be a paradox to call efficiency the necessary evil of progress, but it is a necessity which has evil tendencies in its train and half the history of civilisation is concerned with them.

4. For these evils, however, there is a corrective in other sides of social development. In the life of a community we have seen that there must be elements of mutual pressure and constraint, but also elements of co-operation and harmony. It is the latter which derive directly from the social principle and they are not incompatible with effective organisation, provided that there is a spirit of mutual service and a living sense of a common good. Such a spirit arises very readily in a little group of clansmen who fully understand one another's needs and are constantly subject to common dangers or working for common interests, palpable and near. It involves a far higher development of mind when it operates in a great differentiated community concerned often with interests

remote from the average man and difficult for him to realise through the medium of parliamentary representation and perhaps abstruse statistical calculations. In particular it is difficult for the spirit to deal with the machinery of government which the requirements of efficiency on the large scale have evolved, to admit the necessity of rulers and yet hold the ruler in the last resort accountable to the very men who from day to day are under his orders: in a word, to reconcile effective rule with the subjection of the ruler to the community. Yet such is the task of political freedom, achieved with considerable if not with perfect success many times in history, and it is the necessary vehicle of civilised progress. But there is more in freedom even than this vindication of the common life. There is the realisation of the true meaning of community as something really shared by all its members; not, therefore, as a mere subjection of personality to the common good, but as its participation in a common life, that is to say, as its fulfilment in the harmony of fellowship. For this purpose there must be not only mutual aid but mutual forbearance. Personality develops through free exercise of faculty and judgment and the highest achievement of mind in the political field is to work out the conditions under which freedom of action has the fullest scope without involving contradiction. Here the solidarity of simple groups is much at fault, leaving as it does little scope for individual choice. The subjection and impoverishment of the masses in most civilisations may secure considerable opportunities for the few, but even at its best, efficient government, when narrowly based on the ascendancy of a minority, is suspicious and intolerant of the free judgment which may be inconveniently critical. The very insistence on the common life itself may be impatient of the claims of the individual and not recognise the ultimate necessity of free movement to the permanent progress of the whole, or be unwilling to pay the price of the mistakes which freedom is sure to involve. Thus social development in its fullness is a synthesis of factors which in their separate development fall too readily into conflict with one another. For social development in its fulness involves the extension of co-operative relations to the whole of humanity, the organisation of social functions on that scale with all the differentiations which it requires, the subordination of all such functions to the common good, and the re-establishment of the common good on the basis of mutual service of free men.

5. It will be easily recognised that such development in its fullness sets a problem, moral and intellectual, which only the highest development of mind can solve. In the actual history of society, such a height has not yet been reached and the several factors of growth operate one-sidedly and often in mutual conflict. Reviewing the Simpler Peoples as we proceed from the lower Hunters and Gatherers to the higher Pastoral and Agricultural peoples, we observe the extension of the effective community and the growth of internal differentiation and subordination. We find some form of government establishing itself in the primitive group, in the tribe, and in a wider area, and on the whole we find as we advance that such government has more stable organisation and larger functions. At the bottom the exercise of the function of mutual protection hardly extends beyond the Primary Group and we find that even within such a group a wrong done by one member to another is often a private affair in which only the sufferer and his immediate relatives will take action. Often we find that the group will take common action only in the case of offences which, whether for secular or sacral reasons, are held to touch the common safety. In the early stages of advance that distinction persists in the tribe or the village or district which owns a common name and recognises some distinctive social unity. We still find that mutual defence is in the hands of kindreds or partial associations and that the common rule is concerned with the assuagement of quarrels between sections, with means of conciliation, with the substitution of compensation for retaliation and the vendetta. By degrees such rules are more regularly enforced. The judgment of the neighbours, or of the chief, or his delegates, acquires authority. It becomes

necessary to resort to a court before seeking redress, and presently the court will execute its own decisions through its own officers or proclaim the recalcitrant offender an outlaw. Regular procedure is instituted which, except in the most glaring cases, will for proof involve resort to the oath or the ordeal, and in fine we have the rule of archaic law. The steps by which this result is reached vary almost indefinitely from case to case, but among the Simpler Peoples at the higher levels it is the rule rather than the exception ; its establishment implies the existence of a government with some force at its disposal and this force is of course available for common protection and also for aggression. The community becoming larger is also more differentiated. Military organisation involves gradations of authority, finally, a king, officials, nobles, gradations of rank ; and as superiors arise common men lose status and often other peoples are subjected and reduced to a tributary or semi-servile condition, captive women and later, captive men, are reduced to bondage, and hereditary classes of the unfree or semi-free are formed. We find the existence of slaves and serfs on the one hand and of grades of nobility on the other, becoming more frequent in pretty regular correlation with the rise of industrial knowledge and skill. Economic differentiation also sets in. In the lowest stages the gathering of herbs, fruits, roots, etc., is largely the work of women, while the men pursue the chase, which in the higher hunting levels, particularly where fishery is developed, becomes a more important element in the economy. In the pastoral development the men take a large part, but agriculture in the earliest stages is mainly a woman's pursuit and it is not till the second stage of its development that the men come into it regularly. At this stage, and more particularly at the next above it, more specialised industries begin, metal work in particular, and with it, distinct classes of artisans.

With the appearance of the means of wealth in rude form, the question of the tenure of property becomes important. Private property in little, purely personal belongings, seems to be recognised from the simplest stages that we know, though qualified by customs of sharing, borrowing and more or less obligatory giving and returning of gifts which make it sometimes difficult to distinguish from a free and easy kind of communism. As to the ownership of land, which is the basis of industry at this stage, the question is complex. There are evidences of private or family ownership as well as of gentile, group, clan or tribal ownership. What is clear and of general application is that there is no land question. All have access to some land and it is quite exceptional to hear of any consideration being given for the use of it. Similarly in the first stage of agriculture, occupation is seasonal and agreed by the little community, or assigned as in the 'Germania' by the *principes ac magistratus* at the beginning of the tilling. But with more settled agriculture, permanent houses, and a larger population, tenure grows by custom into permanence. The waste and perhaps the pastures may remain common, but the cultivated land becomes the definite property of clans, families or even individuals. Chief men, the chief himself, or nobles under him, are apt, moreover, to exercise the residual rights of the community and some of these change in their hands into property rights of their own. We find an increasing number of cases in which the land may be said to belong to chiefs or nobles, the commonalty being tillers or occupiers whose position is in greater degree precarious or dependent.

Meanwhile the growth of industry involves exchange both within and without the community. From the lowest stages that we know, men share and exchange gifts on a rough basis of reciprocity. These exchanges go outside the community. They are a feature, for example, of hospitality. Sacred objects even are lent, no doubt in the lively hope of favours to come, and groups or tribes which have a monopoly of salt or some kind of stone or other material allow access to it to friendly outsiders. Where they are too shy of one another for personal intercourse, they still make use of the maxim *do ut des*, and we get the development of the Silent Trade. The next step is the regularisation of the implied barter, and regular exchanges on this method grow up, in the first place probably between separate groups, while closer specialisation makes it necessary within the community. Needless to say, trade, much more than direct industrial production, emphasises economic differentiation, which is fixed and exaggerated by the cumulative action of inheritance, and only held in check by the variety of the methods in which superiority may assert itself, such as the opposition between industrial and military ability, or between secular position and spiritual prestige.

Thus ordered societies, some settled as agriculturists, others roaming over considerable tracts with flocks and herds, with some development of specialised industry and a social order exhibiting marked gradations of rank, are found among the Simpler Peoples as described by modern travellers as well as those of earlier times. Early man, at the period when historical records begin, had already formed communities of this type in favoured spots, such as the river valleys of Egypt and Babylonia, and apparently some of the oases of Central Asia as well. The invention of writing, together with the introduction of copper and some other metals, aided perhaps by the advantages of combined labour in irrigation, carried men in these regions over the boundary of what we call civilisation. Little city states arose in Sumer on a definitely theocratic basis, and we may compare with them the Egyptian Nomes with their distinct Nome gods. These little states had a longer and probably a more vigorous life in Asia than in Egypt: at any rate much more that is known to history. But in both cases the tendency to wider union prevailed, though not without relapses into periods of feudal anarchy or of common subjection to a less civilised conqueror. Thus permanent kingdoms of considerable size were formed and successful wars might originate empires of still more ambitious dimensions, though of much less endurance. An elaborate civilisation came into being, a powerful priesthood, a hierarchy of officials, great building operations—as successful warfare gave a good supply of slave labour—large systems of irrigation, a high development of art and the beginnings of science, of literature and of religious speculation. These developments belong in the main to the earlier part of the historical period. Thus, while Egyptologists trace a series of advances up to the fifth dynasty, they show us that the Egypt of that time is in most essentials the Egypt which Herodotus found between two and three thousand years later. But in the meantime the area of civilisation had spread. Chinese civilisation, though no dates can be fixed with precision before the eighth century B.C., was already old at that time. By the same century there were living and vigorous centres of culture in the Punjab, on the Ganges, and in Iran; Hebrew prophecy was beginning its career, the civilisation of the Aegean lands had flourished and fallen and finally yielded to the young race which was laying the foundations of the new type of community. Later civilisation emanates from the centres thus formed either by expansion or by the absorption of immigrants and conquerors.

We cannot here enter on a comparative treatment of civilisation, but our business is with the factors of social development and we may consider the movement of civilisation as a whole in the first place as an extension of the developments which we have traced from the simplest communities to the level of the higher barbarism. In general the social and economic differentiation that we have already remarked is carried further in correlation with the growth of industry and commerce. The increase of wealth affords a larger surplus over the necessities of life, and its concentration sets certain classes free to enjoy the opportunities and exercise the power that it yields. The area of settled order continues on the whole to expand. The Sumerian city states, the Egyptian Nome, the Indian tribal republics of the Buddhist era, or the dominions of a Chinese princelet of the feudal period are counted small amongst civilised communities, but would rank as large among the simpler societies. Moreover, the tendency is towards still larger aggregations under great military monarchies. The principle of authority is widened and deepened, fortified by religious sanctions. The king is a god or the descendant of gods, or the representative or anointed of God, or, finally, rules by divine right. Next to him stand great nobles, partly his officers—civil officials and vice-gerents, who strive, often with success, to make their position independent and hereditary—partly the rulers of conquered peoples who have accepted their subordination on terms. By their side stands the priesthood, essential to the moral prestige of the entire order and hence sometimes asserting supremacy and actually becoming the dominant caste. Below these privileged orders stand the mass of the people who are indeed best protected where archaic institutions like the self-governing village in China and parts of India, hold their own. The government, when strong, maintains fairly good order. Public justice administered by regular courts becomes general ; but differences of rank are often explicitly recognised as a ground of differentiation in the treatment of offences and even where this is not the case it is a recognised difficulty for an inferior to obtain redress from a powerful man. Procedure by evidence and written documents tends to prevail over appeals to the supernatural, but the use of torture is allowed in extracting testimony, and cruel punishments are common. Various forms of slavery and serfdom occur, but their character and the degree in which they affect the social structure, the ratio of the unfree to the free, varies greatly from case to case. With the progress of wealth and power these distinctions do not tend to diminish ; the number of slaves multiplies with successful war and the increase of slave trading. In India, where caste distinctions are more important, these develop from mere germs at the close of the Vedic age to a complex structure in the time of Megasthenes.

6. The interest for us lies not in the description of a particular society or period, but rather in the fate of a principle which runs through civilisation from its beginnings to our own day ; the principle of authority and subordination as the basis of the efficiency and extension of the social structure. This principle is in fact always held in check by certain incalculable forces. One of these

is the conflict between the different forms of power; between monarchy and aristocracy, the priest and the soldier, hereditary rank and personally acquired wealth. Another and a deeper one rests in the paramount necessities of social life. The very poor must live if they are to contribute their quota to the body of wealth, and on the whole they must have the economic inducement of seeing some fruit of their labour (for the cruder forms of compulsion get the least out of men, and even slave systems of any stability have to offer hopes and promises to the industrious slave). Social systems in the long run perish as Plato showed, by their inherent vices, and some of the worst forms of oppression thus rid the world of themselves.

Lastly, and at bottom as the converse of the last proposition, the archaic institutions of society with their elements of reciprocity and spontaneous association exhibit their vitality in the midst of the authoritarian order. The patriarchal family, the Joint family and the self-governing village, play their part in the protection of the humbler classes and in some cases, as in China and in parts of India, seem to be for long ages the real and effective carriers of the social life upon which the authority of the central government and its officials is imposed as something extraneous and remote. Again, the actual circumstances of life in large and very differentiated societies secure certain forms of freedom to individuals—choice of occupation, for instance, if caste rules are not too rigid; migration; choice of friends; the mere escape from notice in the crowd. But as a principle of government, the common good, resting on mutual service and the willing loyalty of free men, is a growth of high civilisation and an incomplete growth still. We have noted the early tribal republics of India, which made some advances in constitutionalism. But the first civic states proper that are at all clearly known to history are still those of Ancient Greece. Derived probably from a union of tribes on the basis of approximate equality, they seem to have accepted as much of kingship as was necessary for sacral or military purposes, and then to have further limited or got rid of it in favour of the power of the tribesmen or their leading families. In the latter case they leant to an aristocratic, in the former to a more popular system. But in either event there were generally those outside the circle—subdued aboriginals in the Dorian states, slaves and aliens in the growing industrial and commercial states. Nevertheless the idea of organised government and settled law resting not on enforcement by superior authority but on the rational acceptance of loyal citizens, was there, and was clearly brought out by the Greek thinkers. The principle was not pushed through to include all who lived together—women, slaves, serfs, barbarians. It was not based on personality or if this was attempted, as by Aristotle, it was made the occasion of very arbitrary distinctions between the persons who are by nature capable of rational life and those who are not. It was incarnated only in the city state where patriotism, narrow in proportion to its intensity, stood in the way of effective union on what we should call the national scale. We see the question of area coming up at a new point. Ordered freedom could be achieved in the small unit before it was possible in the larger, and Rome, which in a manner extended civic rights on the great scale, did so only in proportion as they lost their political value. A measure of freedom returned in the cities of the Middle Ages, but the larger experiment of freedom on the great scale has been begun in the modern world and is still in progress, still hampered by the same difficulties of effectual co-operation on the grand scale, by national rivalries, racial antipathies, economic inequalities, and the whole problem of finding a common agreement amid the welter of diversities that proliferate in a world society.

7. Our present concern is not with the possible solutions of these problems, though we are bound to point out that their urgency proves that the principles of freedom and mutuality must either go forward or go back. We must either find some way to an effective internationalism or encounter wars which must break up industrialised and organised civilisation, and we must either discover methods of fuller voluntary co-operation in

industry or prepare for a succession of conflicts which must end in industrial paralysis. What we have to do here, however, is to take development at the stage which it has actually reached and not forgetting that this stage is somewhere on a steep and dangerous slope, consider what ground has been actually made. From that point of view we must recognise that in modern times the principles of freedom and mutual service in social life have made great though incomplete advances, proving themselves capable of reconciliation with good order, high industrial efficiency and a considerable extension of area. They have been the correctives or complements of that one-sided development in scale and differentiation which has played so large a part in civilisation. Bringing them into the account we are better able to compare the actual development of social life with the growth of thought, a comparison which is of the first interest to our general enquiry.

Let us note, first, that the actual efficacy of ideas in the moulding or remoulding of society is itself a matter of gradual evolution. In the lower societies customs change through the pressure of new needs, but that change is unconscious—so much so that if it becomes overt it has to be explained away. This unconscious growth persists in the highest phases, but is almost the only influence of any importance in the earlier stages of social growth. We have next the deliberate acts of a Government, in its simplest embodiment the ordinances of a chief taking particular decisions which affect the welfare of a community or giving interpretations to old customs which substantially make new customs. In the extension of the community these decisions have to be generalised and codified, for the ruling authority now has to deal with a variety of customs and must select or compromise or even invent. Custom in a state of conflict loses much of its force and we have now beside, and ultimately above it, law, backed by authority and the use of force. From the mere declaration of law we pass, in the more developed societies, and particularly in self-governing communities, to deliberate legislation, wherein the community consciously sets itself to remedy inconveniences and redress wrongs, while, finally, legislation comes to rest on more or less systematic effort to secure the triumph of distinct social ideas, and is promoted by voluntary associations directed perhaps to some special end but inspired by a general conception, whether well or ill-grounded, of the true lines of human development.

Thus it is only at an advanced stage that ideas acquire the rational coherence that makes them a force in social life. In general the ethical factor is only one of the influences shaping the life of man, and the social structure at any time is the result of the interplay of countless individual forces moved by their own impulses, seeking their own ends, good or bad, social or anti-social. Shaped by these forces, the social structure grows, stagnates or decays. But even when it grows it is by no means to be assumed that it necessarily advances on ethical lines. On the contrary, the mere increment of strength may itself induce elements of discord, and, in fact, of sheer iniquity in the recognised code from which a simpler life is relatively free.

When we consider a great community in which order and security are effectively maintained by a superior authority so dominating the mind that physical force may retreat discreetly into the background, while the arts of peace flourish in tranquility, and military success feeds national pride—when we compare such a community with a little, undifferentiated group of the simplest peoples we cannot deny that the former is in important respects the more highly developed of the two, but it is a one-sided development in which much has been lost. Divisions have come about within the community ; life on the whole rests on constraints, forces, inhibitions, which are most effective perhaps when they are least conscious. We are not approaching but departing further from the ethical conception of a common good, equitably shared and freely served by all. So far then the lines of ethical and social development part company, while the ideal of civic democracy realised on a small scale in antiquity, and on the larger scale in modern times, is at lowest an effort to bring them together again and supply the constitutional basis required by the ethical conception of society.

8. Recognising that the effectual influence of ideas on social organisation is in the main a modern development, we may now consider briefly how far they have attained effective expression. To begin with government itself, we saw efficiency and extension of order long bound up with subordination. Most modern communities now accept the principle that government does not rest on the authority of a superior but on its function as an organ of the common good for which it is in the last resort responsible to all members of the community. How far political freedom thus understood is a living reality is a question which must be answered differently in different cases and runs back into a complex of historical developments and contemporary difficulties. In one or two cases owing to the vehemence of internal conflicts the principle itself has been set aside, but the dictatures thus established show every sign of instability.[1] Some measure of political freedom may be deemed the norm for the more advanced nations. The working of free institutions involves the good-will of the population in general and thus brought up the question of dependencies and subject nationalities. The problem of nationality was handled one-sidedly in the Versailles Settlement, and hyper-excited nationalism is proving almost as dangerous as the callous repression which engendered it. But on the whole, having in particular the history of the British Dominions, and Ireland among them, in mind, we must register an important advance towards the ideal of government by consent so far as white peoples are concerned. In Asia the problem is still unsolved, but the mere fact that it has arisen is a great step towards political freedom. A generation ago the best hope for the world seemed to lie in the spread of enlightened ideas of administration among the white peoples, to whom it was conceived that the government of the world must fall. It is now possible to contemplate a much greater equality in freedom, but we are here confining ourselves to achievement and for the present this

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[1] The Soviet dictature is not in this category, but appears rather to be a normal stage in the development from autocracy to democratic institutions.

for the peoples in question is to be expressed mainly in terms of mental emancipation.

Returning from the possible expansion of political freedom to its actual achievement where pretty fully realised, we must ask first what it has done for freedom in general. Primitive communities afford little scope for initiative and originality. Authoritarian communities interpose many barriers—rank, class and sex—while government, though often in practice easy-going, still when policy requires claims authority without defined limits, over all sides of life. The modern community in general boasts that it secures for the individual as of right freedom of worship, freedom in the expression of opinion, freedom of association, freedom in the choice of residence and occupation, and all on the security of that personal freedom which means subjection to law only and not to any personal arbitrament. If we looked closely into the facts we should have to admit that some of these liberties are chequered with shadows of intolerance; that, for instance, the right of expression is still subject to attack and is not always secure in time of war or civil commotion when, perhaps, criticism is most urgently needed. But when the fullest weight is given to exceptions, the achievement in this direction remains substantial. The modern state has indeed come in for a good deal of criticism for the extension of regulation in industrial life, but here its defence is that it is protecting the economically weak against the strong. Experience shows that unfettered freedom in the industrial bargain while working well enough between equals, became an engine of tyranny in the hands of power, and in supervising it the state has acted not in restriction but in furtherance of a more equable freedom.

The ethical ideal is Universalist, and it was on this side that we found the most conspicuous clash between social and ethical development. Doctrines of universalism or at least of the brotherhood of all true believers were inculcated by the higher world religions. They had their effect on law in the ancient world through the influence of the Stoic jurists. They have done much to inspire political movements in modern times. What can they be said to have realised? In the first place the reign of law has become fairly complete. Differences of wealth and social position do not—as often in earlier forms of the State—affect general legal obligations, and if the costliness of civil justice still allows too much power to the long purse, it is not as a rule possible to evade criminal justice by influence.[1] The elementary rights of protection are, with the limitations to be noted presently, secured to all. Further, in maintaining order and punishing crime, the modern state relies less and less on the severity and unscrupulousness which disfigure authoritarian justice. The convicted criminal, not to speak of the accused, remains a man with claims that are not ignored; punishment has been in considerable measure reformed by the abolition of barbarities, by general mitigation, by the classification of offenders and the special treatment of the young, and by the partial introduction of reformatory methods. In the suppression of crime it falls into the place of a weapon in reserve, and reliance is placed on better police, improvement in social conditions, and the enlistment of general sympathy on the side of law.

If we go beyond the realm of law and ask how far the real benefits of civilised life have been made universally enjoyable, the answer is not so simple. Modern development has not impeded vast economic differentiation, but it has been materially influenced by the demand for equality of opportunity. This ideal may be said to have disintegrated the sex barrier, the class barrier, and, to a great extent, the barriers of nationality and race. There remains the deeper form of the racial barrier, the colour line. Of this it is not possible to speak accurately in general terms. In some cases it has been surmounted and in others not, and in some instances it constitutes the exception noted above to the universality of the protection afforded by the law. Upon the whole it may be said to constitute the most serious exception to the general rule of fundamental equality of rights and obligations. Further, the modern development has not confined itself to the removal of barriers. In the provision of public education it has taken a long step towards making equality of opportunity a real thing, and at the basis of the social pyramid it has sought to establish an economic minimum adequate to the requirements of civilised life for all its members.

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[1] Exceptions may be quoted, but I think the norm is fairly stated.

On the other hand, the great inequalities of wealth and economic power remain, and they are still propagated by inheritance; there is still a division between those whose function is directive or intellectual and interesting, and those whose work is manual and often mere drudgery; there is still a leisured class, and still a number (in this country a growing number), suffering from enforced idleness through the lack of industrial organisation. Further than this, society has not known how to use the vast increase in its economic resources to promote the general comfort and amenity of life. One might say rather that it has not known how to avert the destruction of amenity. These failures must be set against its successes, the more imperatively because they constitute one of the dangers to the whole modern order. The rift within the peoples widens and the very genuine amelioration that has been effected has so far done nothing to lessen it. One could not then claim that modern society has as yet succeeded in the general task of organising industrial energy for the common good (indeed as a comprehensive object it can hardly be said yet to have been attempted), but it would be equally unreasonable to deny that it has some solid achievement to show in the way of extending and generalising effective partnership in the elements of civilised life.

9. We obtain some light on this limited success when we recognise that there is a double movement traceable in the formation of the modern social order, and especially on the economic side—a movement of emancipation making for individualism and a movement of reconstruction more socialistic in tendency. To the one movement belongs the increasing absoluteness and extended importance of private property. We have seen how the

general availability of land gives way in those authoritarian systems, which succeed in breaking up the archaic institutions of the kindred and the village, to the lordship of chief, king, nobles or priestly colleges. Closely associated with office, rank or status, land is neither in the absolute ownership of individual men nor, therefore, the subject of unfettered bequest or free exchange. With the rise of industry and commerce capital on the large scale becomes as important as land and the tenure of property becomes individualistic. This tendency seems to make for the freedom of the individual and to offer a reasonable basis of reward for initiative and enterprise. But experience and economic analysis combine to bring this assumption into question. It has become recognised that the rights of property must, like all rights, be conditioned by the common good, that property, far from being the reward of service may, through inheritance, be independent of any service at all, and that generally in the production of wealth there are elements originating from nature and from the growth and organisation of society which should enure to the general well being, but under an excessive individualism pass into private hands. With regard to freedom of contract the position is very similar. Contract plays but a small part among the simpler peoples. It was a great step onward in law to disentangle it from archaic formalism, and in the general organisation of society to liberate it from feudal restrictions, caste restrictions, local barriers and the like, to destroy monopoly and open the field to all comers. But society was soon disenchanted with the result. As mentioned above, freedom of contract might lead to the abuse of economic power, and this right, important as it is, is held, like the rest, subject to its bearings on the common good.

In the ethics of benevolence and the obligations of society to the needy we may trace analogous developments. Here we have first the simple hospitality of early man and the rules of sharing among the kindred or even the entire group, with as much care for the helpless as the conditions of life allow. Then we have charity as the duty of the superior, a duty which is also a moral luxury and the means of other-worldly advancement. With the rise of individualism, benevolence comes in for sharp criticism in the interests of personal character. The point of most importance seems to be that people should be independent and make their own way. The hard facts of economics, however, show that no solution compatible with an adequate development of social feeling can be reached on these lines and the growing sense of collective responsibility recognises a definite right to the primal needs of a civic life on the basis of a system of mutual obligations as between the individual and the community.

Thus in the more advanced societies the double movement of which we spoke is easily seen. On the one hand there is a breakdown of older social structures limiting the actions of the individual, and so a fuller recognition of personal right. On the other hand there is a process of reconstruction, in which the community as a whole exerts powers and undertakes functions previously left to the individual, the family, or some other body. This is a fuller recognition of a common collective responsibility. These two elements, personal right and common responsibility for mutual aid, are the two pivotal points of social ethics, and with regard to their relations generally we may say that in the kinship society the individual has little scope for development apart from the common life; in the authoritarian society his life is usually determined in its main outlines by his status, nor has he any standing ground save that of force for resistance to law and constituted authority. The same is at bottom true of the ancient state, where the subjection of the individual to the common weal is an undisputed axiom except by philosophic sceptics. In the modern world there first appeared the conception that the right of the individual as such might limit the law, and this is not merely a conception but a regulative principle in much modern legislation. But it is a correlative truth that the rights which the individual can claim must rest on law, and to base liberty on law, and the common life with efficient social co-operation on liberty, is the specific problem of contemporary statesmanship. It is still a problem and neither in theory nor practice will the solution be reached in a day, yet the advance in handling it is substantial.

10. In the history of the family the power of the husband and father has effects which in their way resemble those of the element of force in the social structure. The earlier history of the family—meaning by the term the union of husband, wife and children—is not easily grasped owing to the diversity of types with which anthropology presents us and I shall not speak of it here. But we may remark that the advance of culture is in general, though not universally, attended by the extension of the patriarchal family as a close, compact and efficient organisation on a considerable scale, based on the ascendancy of the oldest male. This advance, which serves as shown above to ensure to the individual a certain status, maintenance and protection, is balanced by the accentuated dependence of the junior members and more particularly of the women, whose rights are probably diminished on the whole as compared with those that they enjoyed among some of the Simpler Peoples. It is accordingly an ethical advance when the rights of wife and children are brought under the full protection of the state. Society in this stage stands in direct relation to the members of the family as individuals, and from this basis it is advancing in our own time to the position of 'overparent,' in which it supervises and at need supplements the functions hitherto left to parental care. This position, it may freely be allowed, raises problems of the relation of parental to communal responsibility which are not yet solved, but it has already developed far enough to enable us to conceive the family as a unit organism contributory to and dependent on the larger organism of the social life. We may then compare the development of the family with that of the community as sensibly diverging from the line of ethical development but as returning to its allegiance at a higher stage.

With the development of the family the whole position of women is intimately bound up. Broadly the development here is a particular case of the generalisation of rights. The superior rights generally claimed by the male are a case of group-morality, and the growing recognition of the equality of status due to woman a simple application of the general idea of universalism. Historically the case is complicated by the many factors affecting marriage and the family life, and by economic factors which have sometimes raised and sometimes lowered the position of women. There is no general correlation between the position of women and the level of culture in other respects, but in every grade, civilised or uncivilised, there is a proportion of instances in which it is favourable. Among the very simplest peoples this proportion seems to stand rather higher than it does among more advanced folk, and in the archaic civilisations again the position of women was sometimes better than it afterwards became. On the other hand, in early Rome it was, under the extreme development of the patriarchate, one of great dependence, while later Rome gave women more liberty than they were ever to enjoy again till quite modern times. The patriarchal family on the one hand, and in different ways, militarism and ecclesiasticism on the other, were all adverse to their equality with men in freedom and general status, and though mediaeval sentiment might gild their chains, it was the modern conception of personality which struck them off and has put the status of women, married or unmarried, on full equality, social, civil and political, with that of men. Once again it is only at this level that divergent social developments reconcile themselves with the ethical.

11. Thus if we look to the relations of man in the family or the community we recognise a certain lagging accommodation of social to ethical development. More than this, the experience of life would not allow us to expect. What has been achieved is not the ideal, though it is a solid improvement of the social structure. When we look to the external relations of communities can we say as much? We observe first that the outstanding feature of modern life on this side is that relations are now world-wide and, even between comparatively remote peoples, are close and constant, where of old they were at

most fitful and uncertain. This is in itself a great step forward in social development, but it brings with it a multitude of difficulties and dangers. The world has become in a sense one society and yet lacks an effective organ of common government. The internal progress that we have described was closely associated with the rise of independent nations which claimed absolute sovereignty and were with difficulty persuaded to recognise an international law as morally binding, but without central authority, interpretation or means of enforcement. This law had the merit of recognising limits to the barbarity of war and securing some consideration for personal life and property during the combat and after the defeat, but except for a brief interval in the nineteenth century, militarism grew and ate more and more into the life of the nations. Criticism of its advance was admitted to be right in principle and was set aside in practice. At best there was some tendency to accept arbitration where passions or interests were not too keenly roused. The Great War in which this situation issued swept away even the slight restraints of international law. Events showed that modern war is a struggle between peoples in which the distinction between combatant and non-combatant becomes obliterated and the use of propaganda stirs up hatreds that cannot be reduced to reason by the mere cessation of hostilities. Rights of personal property were ruthlessly over-ruled and in defiance of every precept of earlier civilised warfare the blockade was maintained for months after hostilities had ceased; the indemnity imposed was such, as, if taken seriously, must have reduced the whole German nation to a state of servitude; the rights of nationality were pressed to the point of exaggeration wherever they appeared to suit the Allies, but ignored when they told on the side of the vanquished. It must be a matter of concern to all adherents of the democratic principle that the Treaties of 1815 concluded by the aristocracies and monarchies of that day—treaties which for three generations passed as by-words of short-sightedness, now stand as monuments of wisdom in comparison with the achievement of the triumphant democracies of 1919.

This unwise and unjust settlement did, however, contain a plan for a world organisation to supersede war. That the League of Nations should have been associated at the outset with so bad a settlement was a misfortune, and in any case it could not serve its purpose as long as ex-enemy states were excluded. With the admission of Germany and the relaxation of war feeling, new possibilities arose. If we are counting up the achievements of modern civilisation we may now reckon among them without merely gilding nonentities with fine phrases, the creation of a germinal league of the world. Whether the germ is to mature or not depends on the amount of available moral wisdom among the peoples of the world, and whether this will prove equal to its task remains doubtful. From the practical point of view hope is on the whole a better counsellor than fear, but we are looking at the matter as it bears on social theory and theoretically we are compelled simply to register a *non liquet*. We can only say that the alternative appears to be not merely the cessation of progress but the break-up of our distinctive civilisation. Humanity would have to go back upon its traces and find some other way, as it has done before. All that has been said here of modern achievement must be held subject to this overhanging doubt.

12. If we probe this doubt and these difficulties to the bottom they are seen to turn on an old problem in a new dress. If progress consisted, as some have thought, in the development of order it would be a relatively simple affair. What did not square with its demands would be simply suppressed. But if progress consists in a liberation and harmonising of energies, the problem is quite different, and the progress of modern times has in fact involved the liberation of energies on a vast scale and in a great variety of directions. We do not get this liberty without paying for it, and we pay for it in collisions and imminences of collision, violence and the justification of violence. We spoke above of the dual movement in the modern world, emancipation and reconstruction, fuller liberty and larger collective responsibility. If these movements proceeded

in fair balance all would be well, but they do not, and till a far higher level of social knowledge and moral wisdom is reached they will not do so. Here as always true social co-operation involves a reconciliation or synthesis of conditions which in all but their most refined form are opposed to one another. Hence it is that in so many social changes there has been loss as well as gain. The strength of the blood tie that gives vigour to a barbaric clan, that vitalises the tenderness of natural affection within its limits, maintains a personal and a common pride which is also the source of its warlike prowess. To hate the enemies of the clan is at this stage simply the other side of love for the clan itself. The spontaneous growth of each group means war between the groups. If a higher power imposes peace upon them, there is gain in industry and the ways of peace at the cost perhaps of the vital energy which could only flourish in independence. History is full of such exchanges, in which loss and gain seem almost evenly balanced. To take a single instance. The free Roman Republic had become a corrupt and turbulent oligarchy, wholly incapable of administering the vast dominions it had conquered. The new empire was efficient, and it was equalitarian in tendency. It gave a great part of the world peace and civilised law, and by degrees equality in citizenship. There was great gain here to counterbalance the loss of Roman freedom, and yet we may think that the loss of freedom meant ultimately the loss of life. It is perhaps superfluous to multiply examples. Throughout history an advance in one direction is effected at the cost of loss in another. In particular the growth of Authority, valuable for order, stability, industrial progress and some forms of intellectual development, is often correlated with the most serious ethical retrogression, while the decline of authority opens the door for violence. Yet this balancing of gain and loss is not the whole story. If it were, progress would in fact be impossible. But the possibilities of synthesis are not excluded. Wisdom, ethics and the higher statesmanship seek to preserve what is good in the old and fuse it with the new elements and so find the path of harmony, which is equally removed from anarchy and repression.

13. Leaving hopes and fears for the future aside and confining ourselves to the position reached, we observe, as we look over social development as a whole, first the emergence of an organ of social control on the large scale; secondly, the establishment of social order on the basis of political freedom; thirdly, the equalisation of rights and duties and the consequent destruction of many of the barriers that divide mankind; lastly, the development of the principles of personality on the one side and of collective responsibility on the other. But these are the general conditions of social co-operation, the essence of which lies in the reconciliation of free growth whether in the individual personality or in the family or in any form of collective life with organised and disciplined effort for the advancement of humanity. Historically they have too often been in antagonism. To harmonise them requires the highest effort of wisdom and is the task of social ethics in our time. If the achievement is so incomplete that a breakdown remains possible, it is real enough to put a mark upon an epoch.

We saw the fourfold movement of human thought reflected in ethics and religion, in imaginative creation and in the methods of industry. We now see it in the broad result reflected in social organisation. On this side it is true that there are conflicting factors causing one-sidedness in social development, and marked deviations of the social from the ethical. But in the later stages there is a movement to the harmonisation of these factors, and thereby the social and the ethical are brought into line. The convergence is no accident; it is the outcome of the larger and firmer grasp exercised by the human mind upon the conditions of its own existence and growth, and it is because that grasp is still insufficient that the future remains uncertain. Society is not the purely spiritual unity for which some have taken it. Were it so, the forward movement would be direct and undeviating. But neither is society the playground of merely material forces, blind impulses, or selfish aims. The higher factors which we may call spiritual are at work within, leavening the lump, and in the history of mankind their strength has grown.

These factors constitute a permanent cause, making for social development, but they constitute only one group among many which together determine the resultant social life and when we try to measure their achievement in the history of humanity as a whole we must bear in mind what was said at the outset of the manifold centres from which the movement proceeds.[1] There are and have been a great number of societies, and their development is in large measure independent and of very unequal rapidity. It is only by a gradual process that civilisation becomes a single stream. We see the process of unification going on rapidly in our own time. In earlier periods interconnection was less constant and less vital, and so, instead of one evolution of culture there were many evolutions, and certain societies reached a high pitch in one direction or another, even like the Greeks in almost all known directions, which pitch they were unable to maintain. This fact alone destroys any attempt to conceive social evolution as from the first a unitary process. Its beginning is with many separate strands, which are but gradually woven together, and this weaving is itself an important part of progress. Or we may think of development as a line along which many societies make independent advances, reaching a certain point and then resting or perhaps turning back. Yet over long periods the result is an advance in the general level, because with the rise of intercommunication one advance on the average helps another, and the highest point of one date becomes the mean point of another.

Into the causes of arrest and decay I shall not here make

[1] One sometimes sees that alleged fact that 'we have not progressed since the days of Euripides' brought forward as evidence that social progress is illusory. As if 'we' and the ancient Athenians were the same people. Certainly there is a moral and intellectual thread of connection. But 'we' are not the Greeks, but Teutons and Celts, and our 'progress' or want of progress since the fifth century B.C. must be measured by what the Celts and Teutons then were, not the Greeks.

any general enquiry. It is the bare fact which is important to notice. One thing, however, lies on the surface, and yet is too often ignored. The earlier civilisations were mere islands in the sea of barbarism, and they were liable to constant submersion. In fact in the early history of Egypt, Babylonia and China we come across frequent traces of barbaric incursion, and even where barbarism is overcome in war, the contact with it, as plentiful evidence of our own time shows, tends to lower the standard of civilisation. The Greek state perished in the main no doubt through intestine warfare and the spirit of faction, which were inherent defects of its organisation. But it is also true that it was overwhelmed by semi-barbarous Macedon and afterwards by Rome, whose greatest merit was that she could absorb and apply Greek ideas. It is the fashion to conceive the barbarian conquest of the Roman empire again as a beneficent flood sweeping away a corrupt civilisation. But, in fact, the corruptness of Rome has been greatly exaggerated, and if the Ostrogoths were semi-civilised, the crowd of contemporary and later invaders were true barbarians, like the Franks, Lombards and Northmen, or mere destroyers, like the Huns. From the age of Alexander Severus onwards a real process of re-barbarisation began, heralded by the Gothic irruptions of the middle of the third century, arrested by the efforts of a series of vigorous emperors, but destined to go forward till the last of the barbarians were absorbed. This absorption forms a far greater part of history than is as yet understood, and when its indirect and subtle effects are compounded with the obvious and immediate will be found to go a long way in explaining the causes of arrest and decay.

That modern civilisation may share the fate of earlier periods of culture is, of course, possible. The reasons for hoping for a better event have been implied in discussing the potentialities of that which we take to be the highest stage of mental development. Modern civilisation stands above that of Greece or Rome not because it has realised greater happiness for the world or a more beautiful order of life or greater works of genius. These things none can measure. Happiness is naught until it is complete, and only full development of Mind could render it secure. If the world process were to be arrested here, it might plausibly be contended that in the actual fruition the life of Athens was something finer and more worth having than the life of England or France. The modern world stands higher because it is further on the road to the goal, though it may be that its portion of the road lies through less smiling country, and it is further on the road because its Thought has advanced a clear stage in the control of the conditions of life and in the conception of its own aim and end. For the same reason it is gradually subduing both the barbarian without the gate and the Philistine within.[1]

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[1] I leave the passage as written in 1912, but it is hardly necessary to say that the dangers of a real arrest or reversal of civilisation are far more real and near than was then supposed. At the same time the grounds of hope remain.

CHAPTER XII

THE PAST AND THE FUTURE

1. We have traced the development of mind from the first efforts of adjustment to sense-stimuli in the individual to a point at which the entire collective life has become in conception a self-directing unity. What are the possibilities or prospects of further advance? What are the capabilities of development in the life of man, and what ground have we for the belief that these capabilities will be fulfilled? The first reply that suggests itself runs on purely empirical lines. We have traced the path of orthogenic evolution a long way. We have seen it describe a certain orbit, and we may infer that this orbit will be prolonged. We may expect then that the stage of self-conscious development will complete itself, and prepare the way for a still higher and wider spiritual synthesis as previous stages have done. Mind as an organising principle will continue to grow indefinitely. But so stated the inference is hasty and precarious. A curve cannot be produced with any certainty unless its law is known, and we have not as yet been able to trace such a law for the advance of mind. What we have done is to determine the direction and magnitude of the movement, but not its causes. We cannot even say that it is continuous, for we see its movement broken by many hesitations and backslidings of too great importance to be overlooked or dismissed as casual irregularities. Indeed, our whole conception of evolution as a process in which mind is only one, though a growing, factor militates against the acceptance of an automatic tendency to steady progress.

On the other hand, it would be absurd to dismiss the evidence of past development in forecasting the future. If development of a certain kind has occurred, it is certain that the conditions which render it possible exist, and if the development in question has proceeded on a very great scale through long periods of time and over wide diversities of environment, it is a necessary inference that, whatever its conditions are, they are of great permanence and high generality. Now, keeping closely to the empirical results and without any hypothesis as to the nature of the permanent evolutionary forces, what we are able to say as the result of our descriptive account of mental evolution is this—that tracing the growth of mind from the germ upwards, we find an extension, not indeed continuous, but proceeding by successive stages of vast moment, of the sphere of conscious control of racial life. This growth and, therefore, the conditions rendering it possible, run through the entire history of mind and its environment as we know them from first to last. Thus as an empirical generalisation we are justified in the hypothesis that these conditions are permanent, or at least of very wide reach.

But there is no need to leave the problem at this stage. In point of fact, our descriptive account of the process of development does yield a theory of the conditions, though these have not yet been explicitly set out. Thus, to begin with, we have found that, point by point, the control of mind is limited by its scope. The individual organises his life with a certain measure of freedom in so far as he is able to utilise past experience and to bring within his mental grasp that in his future which vitally concerns him. He fails in so far as his grasp is too narrow or as his purposes are not accurately adjusted to his real needs. Now in our highest stage we assume a mind of scope so wide that these sources of failure are blocked up. We assume that it has as a basis to work upon a complete understanding of the conditions of its own development, and that its purpose is a harmony of the elements of value discoverable in the millions of lives that make up its unity. We assume, that is, a scope equated with possible experience, and may we not, along with such scope, assume the corresponding power of control? May we not then infer that growth will continue, because now we have, what we had not before, a sufficient force to secure it?

For the purposes of this argument, however, two conditions are necessary which have been tacitly postulated in this statement, but which are by no means to be assumed without criticism. First, it is assumed that the stage described is complete, that there already exists that fullness of knowledge and rational completeness of purpose which we require to assure us of continuance. It need hardly be said that the reality is far different. This stage is only at its beginning. The organic unity of humanity is still an ideal embodied in mere filaments of actuality. The understanding of developmental conditions is equally in its infancy. How can we be sure that either of them will grow to maturity? If we assume that they will grow further because they have grown so far, we are back in the line of argument discarded above. If we say that they themselves contain the promise and assurance of growth, we apply to the germ what could only be true of the developed state. And there is a further point, which will bring us to the second tacit postulate. Our knowledge of developmental conditions is admittedly incomplete. So far we have seen no absolute barrier to further expansion. But it may be that this is only the result of our ignorance. Suppose that there are, for example, physical conditions which set an absolute limit to the growth, perhaps even to the existence, of mind. What could the advance of knowledge do with these conditions except enable us to recognise them with a more fatal clearness? Suppose, for example, that the energy available for human needs is a limited and diminishing quantity, suppose that the conditions of life upon the earth are transitory, and there exist no means of permanently arresting vital decay. By this I mean not merely what is obvious, that any such means are far outside our present ken, but that the advance of knowledge brings us to a point at which we can demonstrate their eternal impracticability, while at the same time foreseeing clearly as the alternative the final extinction of the human species. Suppose that this impasse is the result to which our completed knowledge brings us, and it becomes evident that in place of an indefinite expansion of mind we must conceive a barrier, remote, perhaps, but rigid, arresting the line of advance on which we have hitherto moved. Conversely, to prove that progress may go forward without limit, we must know that there are no such barriers, but that the conditions of existence are indefinitely malleable by adequate knowledge, a thing which we can by no means assume.

The case then stands as follows. The narrative of evolution leads us to conceive the maturation of Mind in man, through rational co-operation, to the complete control of the conditions of its own development. Given (1) that such a mind were actually evolved, and (2) that the conditions were malleable without restriction, it would be for its own purpose all-powerful, and would, therefore, with certainty achieve progressively the perfection of life. But (1) the evolution of such a mind, though it has made a certain advance, is very far from complete, and (2) we do not know, and have not, indeed, yet enquired, how far the conditions are malleable and how far repugnant or conducive to the further development of Mind. Both questions refer us back to the general conditions of Development.

2. Now the ideal has been defined as a Harmony in the entire life of mind, and the question is whether the conditions of evolution make for or against such a harmony, or whether, finally, they are such as to render harmony possible under the control of intelligence, though not otherwise. Harmony is defined as mutual support between two or more elements of a whole. If these elements are unchanging, their mutual support tends to maintain them unchanged. If any of them consist of internal conditions, which in their interaction produce an orderly series of changes along a definite line, the support of the other elements is something that furthers that development. This principle is co-extensive, not merely with the activity of Mind, but with the organic world. The organism, as will be shown more fully later, is within its limits a harmony. But throughout the organic world

harmony is shot through with discord. The cunningly arranged harmony of the parts and processes of the individual living being only enable it to prey more successfully on other living beings.[1] But, as we have seen, the advance of Mind is measured by the constant extension of the sphere of harmony and the removal of partial disharmony and discord within that sphere. There is here a double advance, the general conditions of which are very simple. (1) As far as two things support each other, they have an advantage in the struggle with others which conflict with one another, and their type will tend to multiply. The advantage, moreover, increases as the harmony widens, and from being very small may become the decisive factor. (2) What applies to concrete individuals applies also to principles, tendencies, modes of action. So far as these conflict, they tend to cancel out. So far as they harmonise, they maintain one another. Hence within any system working on the whole in co-operation, the harmonious tendencies survive and the harmony becomes more and more complete.

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[1] In the lower stages this rivalry appears as contributory to the development of the successful types. Hence the view that natural selection is the cause of progress. If this were true progress must be a self-defeating process, because the struggle for existence on which natural selection depends is the negation of harmony. The truth is, as argued further on in the text, that harmony always involves some selection, but (*a*) not a selection determined by the law of force, (*b*) not necessarily a selection involving the destruction of any other members of the species, but only modification of their character.

I have put it that rivalry 'appears' contributory to progress in the lowest stages. Is there substance behind the appearance? I confess to thinking a more radical view preferable. According to this view progress at any stage depends (*a*) on variations due to whatever cause (*b*) on the suitability of the resultant variation to conditions. It is this relation of variation to conditions which we have constantly used as the explanation of reflex, instinct, sentiment, custom and so forth. Thus it is not the extinction of other types but the suitability of the higher type at each point which is the condition of its advance. At most the elimination of the lower would only be an indispensable condition as long as the food supply is insufficient for both. As to the cause of suitable variations so far as they affect the inherited physical structure, this is at present unknown; so far as concerns the social structure the cause is the effort of mind, in the lower stages to maintain, in the higher to extend and perfect its life.

Thus harmony is not only a product of development, but a cause of development. It is a cause, so to say, of itself, for it tends, in the manner shown, to extend its sphere and deepen its hold. But harmony does not grow by any automatic process. The living being and, indeed, the structural parts of the living being tend, in the first place, to maintain themselves, and it is only by selection and modification that they are brought into harmony with one another. The possibility of harmony thus depends on the plasticity of organic types, and in the lower stages, where this plasticity is small, it cannot advance far. In the higher stages, and particularly among men, the potentialities of development become more numerous and many-sided, and it is possible to select among them those that will harmonise, and so progressively extend the principle. The development of harmony then involves a principle of selection or modification. In the lower stages such a principle is found in the indirect action of heredity, which preserves the variations suited to their environment, and, therefore, among others those which depend for success upon an extension of harmony. But the wider extension of the principle rests on consciousness, which, as the direct organ of correlation, is the means of harmonising the diverse promptings of different structures and the independent aims of different living beings. But even when consciousness has arisen, the law of self-maintenance remains. Every type of life, even every type of action and of structure, tends to maintain itself, and so every fresh advance of harmony which is to replace discord involves modification. It is of the nature of a discovery of a new possibility of synthesis for which the conditions may be long preparing. Hence a system—whether physical or social—which is strong enough to maintain itself at a certain stage may remain there indefinitely till new conditions arise. Moreover, if the internal harmony is imperfect, it may at any period begin to decay, while it is always subject to disruption by external assault.

Thus harmony, though it gathers strength as it goes on, does not assure continuous progress. On the other hand, in the world of mind every felt disharmony is a stimulus to effort. Instead of merely threatening destruction, it is at least potentially a cause of advance. Yet the work of mind does not advance steadily. In general terms the reason for this failure appears to be double. On the one hand the method of dealing with the trouble may be unknown and so remote from existing ways of thought that it fails even to prompt research. Thus people may live for ages in a volcanic region without beginning upon a seismology. On the other hand, the partial order that has been created may itself inhibit further advance. Thus a general survey of savage life suggests that the main responsibility for the arrest which has retarded so many races, is to be shared between the belief in witchcraft and the practice of blood-revenge, which between them keep early society in constant tension and disorder. Yet the belief in witchcraft is a necessary result of normal thought-processes at a certain stage, and retaliation is the first known method of securing any rights at all. It is needless to remark that the gods and kings who superseded the witches and avengers of blood are in turn potential obstacles to further advance.

3. Progress then is an evolution of harmony. This is a self-furthering process in the sense explained, but is none the less subject to arrest by causes of discord within or without. In all but the lowest stages it is effected by conscious correlation, and its development depends on the extension of the sphere of conscious control. As to the conditions and consequences of this extension our review of development has given certain results which may be briefly summarised.

i. Consciousness arises under the conditions of physical life, and in the first place as a means to secure ends subordinate to the general struggle for existence. But so far as the sphere of consciousness extends, it establishes a harmony of which feeling is the medium.

ii. The conditions (whether in the constitution of the individual or in the environment) under which consciousness at any stage subsists prescribe the general direction of its activity, except in so far as these conditions have themselves come within the grasp of consciousness. As between any distinct centres of consciousness (whether in different individuals or in the same individual at different times and in different relations) there is no necessary correlation, and the aims of conscious activity are correspondingly discordant.

iii. The development of consciousness in its principal phases has as its basis an enlargement and a redirection of activity depending on the absorption into the body of consciousness of some of the conditions which have previously operated upon consciousness from without. The effect of this change is in each case an extension of harmony.

iv. Conditions which, under the selective action of consciousness, become conducive to harmony limit its action and thwart its development as long as they remain outside its grasp. Among them the most important is the existence of distinct centres of consciousness, which, until they are brought into relation, have discordant aims and cancel each other's efforts.

v. In the highest stage the redirection which occurs lies in the systematic effort to absorb the entire conditions of development itself. If this were successful there would be no 'external' conditions left to operate. The sources of disorganisation would be removed, and orderly progress would be assured by the complete harmony of interacting parts.

vi. Thus at any stage there exist conditions of further growth which need a further condition to complete them, viz. that they should be understood. If it be admitted that Mind has arrived at the point at which the conception of development becomes the basis of its operation, we have the pre-existing (hitherto external) conditions completed by the new condition that they are recognised, and we are, therefore, in possession of the principle necessary to complete the intelligent control of life, and it needs only to work out its application. According to our previous argument, which showed that each advance in harmony makes the next step easier, this application, far from foundering on any impossibility, should become more rapid and certain as it proceeds.

Our argument, it will be seen, does not show that the movement towards harmony proceeds like a physical action independently of human choice. It shows that it proceeds through human choice. Formally stated, (1) our analysis of the facts shows that it is possible, (2) our analysis of value shows that it is good, that is, holds it up as a possibility at which mankind should aim, (3) our analysis of the motives that determine rational mind goes to show that what is clearly propounded as good will in the end be adopted, and only in this sense and on this condition can we predict. We may conclude that the ideal of harmony tends to realise itself, and that with progressively diminishing difficulty, through the extension of intelligent control.

4. But behind this result arises a larger and more difficult question. We have shown that harmony, so far as realised, is a factor in success. We have shown that the possibilities of harmony can be extended by intelligence. But we have not shown how far they can be extended. We have shown that the conditions are malleable, but not how far they are malleable. We may assume that the mind can ultimately so far control its own action and its own products, such as social institutions, as to achieve a complete internal harmony. But we cannot thus assume that it can also control the physical conditions of life. May it not be that the upshot of the most complete understanding of reality would only be to show that there are elements which refuse to be harmonised with the aims of mind, that there are physical or biological limitations which set a term to development and even to the existence of mind itself? Say that our argument so far has gone to show that in the human race mind may, and probably will, attain a condition of complete internal harmony, together with such control of the conditions of its life as the utmost extension of knowledge renders possible. What are the limits of this control? May they not be seriously cramping? May there not be biological laws recalcitrant against control, which introduce an insuperable obstacle even to the work of social harmonisation and ultimately

engender an arrest and decay on the large scale, as history shows us instances of arrest and decay on the partial scale? Beyond these, are there not physical conditions, the dissipation of energy, the cooling off of the earth, which we can never control, and which stand as an *alte terminus haerens* to all progressive movement, and even to the span of conscious life? Of the positive evidence of such conditions I shall say little. I note that within my own lifetime some of the barriers supposed to be most adamantine have crumbled before the advance of knowledge. Thus, as to biological conditions, down to my own time the argument derived from Malthus was supposed to present an insuperable difficulty. Whatever the temporary advance of comfort, it would be swamped for the masses by the increase of population, and every social reform resting on a deepened sense of unity and a more generous impulse of mutual aid would only defeat itself the more rapidly by the impetus that it would give to the multiplication of devouring mouths. This line of argument, which for three generations served as an intellectual stronghold of obstruction, has crumbled before the actual fall of the birth-rate, as a result of those very improvements which were to flood the world with hungry children. The boot is now on the other foot, and the pessimists have to harp on the possibility of race suicide. As to the pessimism of physical science, recent discovery has taught another valuable lesson. The speculations of Lord Kelvin, deriving an appearance of demonstrative cogency from their mathematical form, led men to conceive the earth as relatively short lived, and the present age as a late stage of its existence. In vain men like Huxley pointed out that the entire cogency of Lord Kelvin's reasoning was in the method of deducing conclusions from its assumptions, that these assumptions were unverified, that they were valid only if our knowledge of the sources of the earth's heat were complete, and that there was no ground for assuming any such completeness. The theory might be formulated with a certain platonic regard for the incompleteness of its data, but in effect it dominated the educated view of the universe until the discovery of radio-activity, revealing entirely new sources of heat, proved the justice of Huxley's caution, and placed the whole question of the terrestrial past and future in a new light. We have now every reason to think that the durability of the earth as a habitable planet is immensely greater than Lord Kelvin supposed, that it is to be measured in hundreds rather than in units of millions, and that we are in no sense witnessing the latter stages of evolution on a dying planet. It may be said that, nevertheless, ultimate decay is certain, but it may be replied that the supposed certainty once more arises from drawing mathematical deductions from facts supposed to be known in their completeness, and the lesson of radio-activity is precisely that we may be very far from so knowing them. As to the Dissipation of Energy, this is still more clearly an incomplete account of the world-process as a whole. For it can proceed only by assuming an infinite quantum of original energy at high potential, of which it pretends to give no account whatever. Its validity is merely in the account that it gives of mechanical process as such, and the more certain it is the more it proves that mechanical processes cannot exhaust reality. It proves that there must within the sphere of reality be, or at least have been, an unknown compensatory process building up what mechanism dissipates.[1]

Neither can we, in face of modern inventions and of our whole account of the growth of mind, set any limit to the possibility of the control of external nature. It may seem grotesque to suggest that the time may come when man will control the movements of the earth or at need accomplish migration to another planet. But a few generations ago it would have seemed equally grotesque to fancy a means of communication across the ocean without so much as a visible connecting mechanism. What can fairly be said against an optimistic view of the future of human control is that it is not impossible, but unverified. What reason have we for adopting it? Why should we think that the constitution of things is such that in time Mind is to have the ultimate sway? Have we any such reason? Can we connect the development which we have followed with the world-process as a whole? Can we base it on conditions that are not merely of wide reach but eternal? To ask this question is to attempt nothing less than to discover in essentials the nature of the moving forces which have determined the whole vast sequence revealed to us by human history, by the study of the animal world and by the geological record, which has made up the life of the world in time. Even had we no question of the future to raise, the actual emergence of so much of life and intelligence as we know, the gradual peopling of the earth with beings of a higher and higher consciousness would be a mystery demanding its explanation. It could be conceived of as no sport or casual result of a rare combination of circumstances. It is rather that which constitutes the main thread of narrative in the account which we must give ourselves of things as experience reveals them. How then are we to understand it? What are the underlying springs of movement? To answer this question we must first enquire into the causation of mind and its growth. We have treated mind throughout as a true cause. In the last analysis is it so, or is it at bottom an epi-phenomenon? On the answer to this question must depend our interpretation, and, therefore, our view of the future of the evolution that has been described. For on the one interpretation mind is a power that is constantly growing, and that has in the principle of harmony the vital seed of continuous expansion. On the other it is the superficial result of an adjustment of forces intrinsically indifferent to its growth or decay.

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[1] See further, Part II. Chapter X., pp. 458-460.

But further, even if mind is a true cause, the mind, whose development we have traced, is only one cause among others. It strives with indifferent and even brutish conditions. It grows and increases its mastery over these conditions. But it has to fight every inch of its way. It can make no pretension to be the Absolute or the Unconditioned. It is a process within Reality, conditioned closely by other elements of Reality. Can we obtain any light as to its relation to these conditions, so as to learn something of the origin and meaning of the development which we have seen in process? This is to ask whether we can get at the causes of the process. There are two ways of approaching this question. One is to investigate the process itself. This we have done as far as we could. The other is to investigate the nature of Reality as a whole. This we might attempt through a synthesis of experience, but here our difficulty is that it is just the incompleteness of experience that has forced the present question upon us. Our only resource is to consider whether we have any general principles which, notwithstanding the limitations of our experience, we can affirm with confidence of Reality in general, and which will help us in the present problem. Now this, it may be said, is nothing but an invitation to enter upon the bog of speculation. The nature of Reality is not to be determined by an analysis of conceptions, but by a synthesis of experience, and when that synthesis fails we can go no further. As against an analysis divorced from experience this criticism has force. But it may be that an analysis of fundamental conceptions, for example, of the causal process, is just the link that is required to complete a synthesis of experience. It may be possible to co-ordinate analytic enquiry and empirical results. In the special sciences abstract principles, when tested by concrete experience, make good hypotheses, and the same method may be applicable to the science which deals with Reality as a whole. If, that is to say, analysis of first principles leads to a certain conception of Reality, and if this conception coincides with that which the widest obtainable synthesis of experience suggests, we have something more solid than a metaphysical speculation, and of wider applicability than an empirical generalisation. I shall endeavour in the end to show that such a correspondence of analysis with experience can, in fact, be found, and that the resulting conception of Reality has more than a merely speculative value.

We have then to ask whether any true knowledge of Reality as a whole can be obtained, and if so what in particular is the position of Mind within the whole. Is it a true cause or only an epi-phenomenon, and if a true cause what is the extent of its control. These questions form the subject of Part II. of this book.

PART II

THE CONDITIONS OF DEVELOPMENT

CHAPTER I

EXPERIENCE AND REALITY

1. We have traced the development of mind from the first efforts of adjustment to sense-stimuli in the individual to the point at which the entire collective life is grasped in conception as a unity. We have seen in this conception a focal point upon which the teachings of experience converge, and from which the future life of the race may be controlled. We have traced the advance of the idea of such control from broken, fitful and uncertain beginnings to the same central point of clearness and comprehension. We have shown, finally, that the development is not confined to the world of ideas, but is reflected in the advancing control actually exerted over the physical and social order. Up to this point our method is purely historical, proceeding by the analysis of successive phases and of the changes involved in passing from one to another. But in opening up the question of the future we saw that this must involve the permanent conditions of development and these we had to recognise could not be fully revealed by the historical process alone. From the concrete development of mind we are thus thrown back on an examination of its methods of action and its relations to the rest of reality. The question is not merely psychological. It touches not only the character of mind and its activities but also their power of making their way in Reality. To answer this question to our satisfaction we must begin by making sure that we are indeed in contact with Reality and not merely, as has often been held, with some world of phenomena or appearances. This, it will be seen,

involves a critical examination of the methods and principles employed in the processes of cognition in general and scientific and philosophical cognition in particular.

This examination will be found to fill a gap which we have hitherto left open in our account of development. For while we have summarily described the movement of thought, we have not examined the value of the result. We have not, that is, enquired whether we are any nearer to truth than at the first. We have spoken of a critical reconstruction as though it somehow brought us nearer to Reality. We have not asked whether the Mind can apprehend Reality at all, and if so, whether it can do so by such methods as we have described. It is clear that our answer to these questions must vitally affect our whole interpretation of the development of Mind, of its drift and tendency. It must also decide our judgment of the relative significance of historical and still more of contemporary movements and controversies. For we are not dealing with a development which is finished, but with one which, however it may have advanced, has left fundamental questions of method still unsettled. As with science and philosophy, so with ethics and social relationships. We have traced the development of the ethical order, but we have not discussed whether the phase which we took to be the latest is also in any justifiable sense to be regarded as the highest. We have not enquired whether its principles admit of any rational justification, and whether, in fine, it can claim any validity which should ground it on something more solid than the fluctuations of feeling and opinion.

But these are the first questions which must be asked if we are to judge of the value and significance, or even of the permanence and probable future of any development of Mind. A mode of thought, a system of life may be rooted in real conditions which will endure, or it may be forced into existence by some phase of mental climate which will pass and leave it to wither. Which of the two is the case of the evolution here traced? Is it to be regarded as a process of continued approach to Reality, and do the later stages of criticism carry us further forward in that direction, or are we merely substituting one illusion for another, and possibly one that is less pleasing without being less hollow?

Our first enquiry then must be into the validity of the processes of Reconstruction which have been described. We must enquire whether the synthesis of experience gives us knowledge of a real order, and whether the principle of a harmonious development rests on grounds which must be accepted as rational and real. If the answer is in the negative, the movement which has given rise to these conceptions loses all ultimate significance. It is a study in the pathology of the human mind. If it is in the affirmative, a very different position is reached. The development of Mind will then be seen as a movement which, after traversing many phases, has arrived at a method of grasping Reality and of directing its own life to ends of real value. In that case the future of development will become a question of the highest interest. There will exist some at least of the conditions of a permanent advance, and it will be necessary to ask what further conditions are required and whether these conditions are realised. This will open up questions of the general conditions of development, and, ultimately, of the whole position of Mind in Reality.

Our first business then is to examine the validity of that Experiential Reconstruction which we have taken as the highest phase in the development of Mind. By a valid process I mean one which, taken as a whole, yields knowledge of Reality. We have to ask then whether any construction of experience can yield knowledge of Reality? May not Reality be not only unknown but unknowable? Or may it be that critical reconstruction, properly interpreted, points rather to some higher way of thinking which puts all ordinary experience in a new light and yields certain fundamental truths which could never be attained by any piecemeal combination of empirical data? Or may it be, again, that it is not by thinking in the ordinary sense but by some form of feeling, intuition or instinct that we approach the deepest truths? All these are questions on which opposite views are still held, views which, if they do not prove the fallibility, at least indicate the incompleteness and immaturity of experiential reconstruction at the present stage of its development.

2. Our account itself emphasises this incompleteness. But the measure of success attained by scientific reconstruction suggests that though of course experience does not give us the whole of reality, what it does gives us is reality as far as it goes. There is on this view no line of demarcation between that which comes within the sphere of consciousness and that which remains outside. The limits are such as those of the eye and ear, and they are limits capable of being transcended, and, in fact, constantly being transcended as new methods of observation are invented and as new categories or principles emerge clearly into consciousness. To justify this assumption would require a complete dissertation on the theory of knowledge, but the heads of argument admit of a rapid summary. In the first place then our knowledge of reality is denied, so far as external reality is concerned, on the basis of an analysis of cognition in general or of perception in particular. The result of this denial is to limit knowledge to a world which the mind makes for itself, whether it be for each the world of his own mind, or whether it be a world in which, in some fashion, all conscious beings have a share. Either view may be combined with an affirmation or with a denial of a further ‘ real ’ world which is beyond perception. In the latter case, the theory may be considered not so much as a denial of the knowledge of reality as rather an assertion that all reality exists within the sphere of consciousness. It may be noted, however, that in this view—as appeared at an early stage in the Humian criticism of Berkeley—knowledge of the conscious subject in any sense except that of the knowledge of its passing states is liable to objections similar to those which apply to knowledge of a material order. What has to be said here, however, is that the criticism on which the whole body of these conceptions is founded is an error, traceable to one or other of three main fallacies. The first is that prominent in Berkeley, that in perceiving it is the

perception which is our object. This is, in essence, a confusion between the asserting of a thing and the thing asserted, or between the evidence of a fact and the fact evidenced. The second is that prominent in Kant, that the order which is in the world is not found there by the mind but introduced there by its fundamental forms of sensibility and categories of understanding. This is based in part on an incorrect analysis of immediate apprehension, from which all orderly relations are abstracted, and the remainder is erroneously supposed to be what is actually 'given': in part, on an untenable view of necessity, which is supposed to be an attribute of mental operations instead of being a characteristic discernible in real relations. Thirdly, there is an argument of a more general kind diffused throughout most forms of idealistic writing, that knowledge is relative because it involves a relation between subject and object or knower and known. This is a case of the confused transference of thought by which the cognitive relation between the knower A and the known B is transferred to B, and because to know is to be in a relation, it is argued that a relation is the only thing known. All that the argument legitimately proves is that B to be known to A comes into that relation to A which we call being known. From such a tautology no human skill can educe a substantial result, either positive or negative.[1]

3. The more serious line of objection to the theory that we know Reality starts from the alleged contradictions of the empirical order. Reality, it is agreed, must be consistent with itself, but experience, it is alleged, contains ineradicable inconsistencies. So far as this is said literally of experience it must be met with a direct denial. Experience can no more contradict itself than can Reality. Contradiction is a relation that occurs between two assertions, one of which affirms while another denies the same thing, and such contradictions arise, not in experience, but in the assertions engendered by thought in the endeavour to interpret experience. Now a thought which

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[1] If these arguments appear too summary I must plead that I have set them out at length elsewhere (*Theory of Knowledge*, Part III.).

contains or involves a contradiction cannot, as it stands, be true. It may contain truth or be partially true, but as containing contradiction it contains error and therefore does not give us final truth. Now the existence of contradictory thinking is a fact with which we are all only too familiar, but fortunately we are also familiar with the compensating fact, that by an extended experience, and, in particular, by a more careful and critical method, contradictions may be surmounted and a deeper or wider view may be obtained, from which both sides of the previous antinomy are seen to contain some truth, while they are in conflict only because they were in some way erroneously conceived. If this is true generally our thought-processes provide the remedy for their own deficiencies, and though our view of reality at any time may involve confusions and misunderstandings. these would be due not to some inherent defect in thought but to an incompleteness which further efforts might remove. The inference would be not that our knowledge is confined to a world of appearance from which it can never escape, but that it is a knowledge of reality obscured and confused in some degree by defects of method which it is constantly seeking and often successfully seeking to correct.

But, it is said, the contradictions involved in the empirical order are more vital than these. They affect, according to some accounts, the very form of our assertions, and are therefore ineradicable, since in correcting them we make assertions of the same form. The simplest judgment, for example, is said to involve contradictions, and the categories of causality, substance and personality are in the same predicament. These allegations touch the general validity of conceptual thought and to understand them we must briefly consider what the concept is and how it can be used and misused. In a general way it may be understood by considering its origin. In the formation of the empirical order connective concepts are formed by the precipitation of various elements of experience. The child's conception of the cat is formed and reformed by many perceptions of soft strokings and perhaps of sharp scratchings, of purrings and of mewings, by sensori-motor experiences of cuddlings and perhaps of chasings, by feelings of delight and perhaps of disappointment. Yet the concept is not a mere replica of the data. The cat is conceived as a variable object, now here, now gone from the child's view, now curled up, now sitting, walking, cleaning itself or playing; dark or striped to the eye, soft and silky to the touch and so forth. The cat as conceived is any or all of these things but none of them in especial. It is the enduring physical unity which in different relations, at different times, or in different places is one or other of these experiential data. The form of unity is not the same in all concepts. In the concept of an individual it involves physical continuity and persistence in time. In the concept of the universal it involves identities and differences of character, *e.g.* the concept of colour is the system of colours as related by resemblances and differences of tint, luminosity and saturation. The unity here is the generic character of which we have now this and now that specific determination, always some one of the number of possible determinations but not all together. In either case if we distinguish the conceptual element proper from the perceptual or the given it appears as a scheme or thread which we construct by bringing numerous given elements of experience under review together, and, having constructed, use by referring further data to their place therein.

This distinction is the fruitful mother both of truth and falsity. Of truth, because the conceptual element that has become a clear and distinct object of our thought is the unit of our general reasoning and so of our systematic thought. We combine several elements, analyse and recombine, apply one concept to another and so arrive at fresh concepts which, it may be, carry us far beyond the range of actual or even possible experience. Of the conditions under which this may be successfully accomplished and of the assumptions involved more must be said lower down. We note here that the disengagement of the concept as a distinct object of thought from the varying particulars in which and in which alone it is in fact realised is a necessity to its functioning as the basis of general reasoning.

At the same time the distinction readily gives rise to falsity, for the conceptual scheme apart from the data which it unites is incomplete. Not only has it no independent existence; its very meaning involves a reference to the data from which we distinguish it. It is a partial apprehension of reality which needs concrete filling to complete it. Hence it comes about that Hume complains that when he seeks to realise a general idea he always 'stumbles upon' some particular instance. But when it is inferred that the particulars alone are real the system that they together constitute is simply ignored, and that they do constitute such a system is part of their character, and that part in virtue of which we can name, distinguish, compare and describe them, in a word, apprehend them for what they are, incidents of a real order. Nevertheless just as we can apprehend the particular without taking note of its relations, so we can hold the concept before us and operate with it without attending to the particulars which it co-ordinates, and we can do this under appropriate conditions with good results.

The process is, however, liable to fallacious use. On the one hand it leads to a false view of Reality. A concept once formed becomes a frame-work into which our experience may be forced and to force it may involve some distortion. For while our conceptual schemes are, in Bacon's phrase, 'very unequal to the subtlety of nature,' we can only define and explain to one another and even to ourselves that for which we can find some niche in some conceptual scheme. We can make nothing of the thing which is neither this nor that but something between. Hence the concrete, the individual and still more, the variable, the changing, eludes us. We can so far define a change as to say that what was A is now A′. But that is to state the beginning and the end of the change, not the change itself, of which we seem only able to say that it is neither A nor A′, and yet cannot be without either of them. As conceived, it seems to be something 'between being and non-being,' not wholly and indubitably real like the static element which we can definitely identify and distinguish. But as all given experience is of this concrete individual character in perpetual flux it is all infected with this unreality; it can only be affirmed, in so far as it accords with the conceptual order, which thus itself becomes reality or at lowest the test of reality.

Thus the relation of thought to experience is distorted. We might almost say inverted. But this is not all. The concept itself undergoes a devitalising process. Separated from the living function of co-ordinating experience it hardens into a shell which is the more empty in proportion as its outlines are more rigid. It crystallises its contents, and indeed any distinguishable element of its content, into an independent object, and takes that object as it stands for something real. Hence it endeavours to separate what are really nothing but distinguishable aspects of one whole. Conversely, it merges into one concepts which though essentially diverse resemble one another under one aspect. It confronts the world of experience with dilemmas demanding that it should conform absolutely or not conform at all to concepts which are in fact derived only from partial characters of experience, and are never given except as qualifying or intertwined with others. Lastly, it crystallises fluidity and movement into separate elements with gulfs between them, wherein true movement is lost.

4. The first pair of these tendencies may be illustrated from the history of the concept of Identity. As a point of view from which to correlate experience this term has two distinct roots. It serves to hold together the object that has many attributes, that appears in different times and places, that undergoes certain changes and exhibits various forms of behaviour. As such it may be more definitely qualified as numerical identity. But the concept of Identity also applies to the several manifestations of an unchanging character, that is to say, to all the elements of experience which present an exact resemblance to one another. As soon as the concept is cut off from the experience to which it refers a blending of these meanings occurs. The two concepts collapse into the element which they have in common—the notion of a unitary centre of

different contexts—and the character is thought of as an individual entity which persists and is numerically one through all its manifestations. This confusion is made into the logical basis of generalisation. The difficulty of arguing from case to case disappears, it is thought, for what truly belongs to the concept in any one instance belongs to it as a unity once and for all, and to deny it in any other case would be mere contradiction. Hence generalisation becomes a question of insight and even of intuition. It is a question of knowing what elements form part of a concept and what do not, and the attempt to form sound inductive canons is rendered nugatory. At the same time the permanence and substantiality of the conceptual world is vindicated against the world of sense, since the concept acquires the unchanging character which the empirical world has lost. On the other hand, the abstract conception of identity gives rise to difficulties. For (*a*) the 'manifestations' of the concept differ even in characteristic quality. The redness of the rose is not the redness of the geranium. (*b*) The manifestation suffers change, the red of the rose deepens and fades and (*c*) in the strictly conceptual order it is not the rose that is red. The quality or characteristic identity of the rose species is not the same character as redness, but both more and less. With this puzzle predication itself becomes impossible, and our ordinary ways of thought are triumphantly dismissed as pertaining to the world of illusion by some metaphysicians. Others with more insight perceive without perhaps deserting the conceptual method that it is our way of taking the concept that is at fault. Identity is in fact a concept formed from and applicable to objects that are in one way or another different. It implies *some* difference, and is compatible alike with change, with variety of aspect and specific differences of character. Bare identity, identity exclusive of any difference, is an abstraction within an abstraction. It is in fact a false abstraction, to which nothing corresponds, and to endeavour to fit an experience or a thought into it is precisely like trying to construct a curve which shall be convex without being concave. Thus by the separation of the concept of identity from the experience in which it arises two distinct fallacies arise. One is the confusion of two meanings of the term by concentrating on the point which they have in common to the neglect of their essential differences. The other is the formation of a wholly unreal and impossible category to which thought and experience are to be subjected, with the result that they are condemned as illusory and full of contradictions.

So far the first two forms of fallacy. Let us consider next the tendency to ' harden ' aspects or processes which in experience are interwoven into things which are mutually exclusive. Under the hardening treatment the common categories can be pitted against one another and shown to be mutually irreconcilable. Thus as long as the concepts of substance and cause are taken as self-sufficient entities, or as exhaustively characterising the real nature of certain entities, it is impossible to reconcile them. Substance is the abstraction of self-supporting existence. What is substantial as such is therefore either unchanging or if there are changes within it they must be self-determined changes. What then is a cause ? The concept of causality is that of change determined by interaction, and when the two concepts are put together we arrive at the idea of interacting substances, that is of self-determining things which are determined by one another—a stark contradiction. The possibility of a solution in which neither concept loses its value appears when we consider each of them as arising, uncritically in the first instance, as a rendering of certain elements of experience. It then becomes clear that to render reality as a whole intelligibly we must give due place to these elements, but must also recognise that each is only an element and not the whole of the truth. What is real is self-maintaining, but it is also a system of interrelated changes. The element of permanence in that system is its substantiality, the orderly continuity of its changing phases, its causality. The notion that a given object must either be ' a substance,' as we at first conceive the meaning of that term, or must be wholly insubstantial, is seen to be a false dilemma, and what is self-determining—whether, indeed, anything short of reality as a whole is self-determining—and what contingent on surrounding conditions becomes a purely empirical question. The concepts of substance and cause are resolved into the abstractions of continuity of real existence on the one hand and correlation and consecutiveness in its changes of character on the other.

5. We have seen how fatal the 'hardening' of the categories may be to the concepts themselves. We may consider, lastly, how it distorts our rendering of experience itself by transforming the fluid and continuous into a series of crystallised terms divided by the void. This particular trouble connects itself especially with the function of analysis. For the clarity of our concepts and in particular for ease and safety in combining or applying one concept to another, we need elements that are perfectly precise, unambiguous and identifiable with ease in whatever context. Experience as it comes to us does not yield such elements and to find them we have to distinguish and sift, sorting out common elements and throwing aside differences. That is to say, we analyse; and when by analysis we have arrived at elements each precise and constant in itself but also fully comparable with others, so that every point of difference is itself precise and definite, we have a system in which all the varieties have their well determined character stated in general terms. Our analysed experience thus assumes a mathematical form. We have the requisite data for calculation, with all the extension of power which that gives us. But in thus conceptualising our experience we may forget that the very process of analysis opens a door to fallacies of partiality and incompleteness. The dangers of such fallacies have sometimes been exaggerated. It is not reasonable to condemn the proposition that the sky is blue on the ground that it must be a blue of a particular shade, luminosity and so forth. Any actual blue must be a qualified blueness, but does not cease to be blue on account of such qualification. The trouble is not there. It arises only when we seek by analysis to give an exhaustive account of the whole from which we start, or rather, it is

revealed when we seek, though it produces its worst effects when we do not seek but think we have found. The cruder forms of fallacy consist simply in taking the elements that are precisely identifiable and measurable for the whole, discarding the residue as metaphysics or mysticism or sentimentality. Thus the measurable desire for gain is often reckoned as the only motive that need be taken into account in business because other motives are variable, sentimental and difficult to reduce to any common measure. Nevertheless such motives operate and any science which disregards them is incomplete and will lead to false conclusions. A more subtle form of fallacy arises in the complementary partial analysis when characters, relations or other dependent abstractions being distinguished, named and discussed become separate for thought from that which they qualify and so harden into entities independent of that in which they have their being. These being recognised as inadequate the missing elements are similarly precipitated and transformed to the requisite degree of self-sufficiency. The result is a reconstruction which is related to reality much as an exceedingly ingenious automaton to the living being which it simulates.

The tendency to fallacies of this order as well as the effort of thinkers to overcome them, may be illustrated from the attempt to render continuous reality in discrete thought. The fixity which the concept needs in order to be easily handled as a unity in inference, contrasts with the actual continuity which experience yields. Hence, abstract thought will resolve a continuum like space into an assemblage of points, or time into a succession of instants, or motion into a successive occupation of positions. The point is the boundary of a line (or, what comes to the same thing, of a segment of a line), just as the line is a boundary of a figure. It has, as Euclid justly remarks, no parts and no magnitude, because it is not a division of the line, but an abstraction within it—the abstraction of its end or beginning, which can neither be perceived nor strictly speaking conceived apart from that which begins or ends. But in proportion as the point becomes a distinguishable object these conditions of its existence tend to fall away and it becomes the ultimate element of space. For this purpose, either it must receive magnitude which contradicts its essential purpose, or the spatial perception must be declared to contain a contradiction, and we get the Zenonian dialectics by which extension, motion, and, indeed, duration as well, are shown to be impossible. We attempt reconstruction through the conception of infinity. No finite number of points arranged in order, each next to its fellow, builds up the continuous line. Only an infinite number can do this, and the infinity is of such a character that it breaks out between any two points, however close we may endeavour to take them. No point is next to any other, because between every two points there is always another, and that is to say, there is an infinity. Now this account draws a just conclusion from its hypothesis, but the hypothesis itself is open to more than one interpretation. If we keep resolutely to the conception of the point as devoid of magnitude, no number of these zeros will lead us anywhere. But this result seems to be falsely interpreted if it is taken to mean that space is an assemblage of point-elements of which there is actually, in the shortest possible line, an infinitude. This conception would balance one fiction with another. The true interpretation appears to be rather that the point is the abstraction of position within a continuum, and that no summation of such abstractions will yield the continuum itself, but rather that in the smallest possible quantum of the continuum the abstraction could be repeated in an infinitude of different relations. With this conception I think we approach a genuine intellectual reconstruction of the sense-percept of continuity.

As continuous space is dissolved into points, so time is conceived as a succession of instants, though there are no instants and no breaks between the end of one time element and the beginning of another. In the same way, motion is regarded as the successive occupation of positions, though the moving body, strictly speaking, occupies no position. However short the time taken, it is moving through space, not occupying a single position in space. Now for the purpose of calculation, the error involved in treating the moving body as occupying a position may be made as small as we please. In the same way, motion in a curve may be resolved into a series of motions in very short straight lines meeting at very wide angles, and the error may be reduced below any assignable point, and generally the rate of a continuous change may be treated as the limit which we should arrive at by taking the difference between two values, each being regarded as a value momentarily possessed, and by reducing the difference indefinitely near to vanishing point. This approximative method was, until recently, taken to be the logical basis of the calculus, which was therefore conceived as resting upon a fictitious resolution of the continuous into the discrete. In this resolution there was an unavoidable element of error which was harmless, because it could always be reduced below any finite magnitude, but served to show the ultimate incapacity of the human mind to grapple with the real by rational methods. Theoretically it could only be justified by the assumption of infinitesimal magnitudes, an assumption which could be shown to involve contradictions. More modern analysis shows that the calculus gives an exact reconstruction of the continuous depending on the distinction between the limit of a series of values and any actual value within such a series. The theory of the calculus defines the limit with precision and without assuming infinitesimal magnitudes, and proves that it is not the approximate but the exact and unambiguous measure of continuous variation. Thus, in this instance again it would appear that while the first movement of thought breaks up the continuous into the discrete, its final aim is to surmount this point of view with the fictions involved, and to equate its concepts with the continua which actual experience yields.

6. The movement of thought in this region throws light on those difficulties which centre upon the conception of infinity and have been often taken as involving all finite experience and all finite thought in insuperable contradictions. As to the contradictions, we must from the outset discriminate. In the bare idea of a space, a time,

or a causal process extending without limits there is no contradiction. Contradiction arises, if it arises at all, only when the world of space, time and causation is conceived as a complete system. Now we shall see presently that there is a sense in which the conception of the world as a system is involved in the general postulates of thought. This system moreover must be a single system, and it must be possible to say certain things of it universally. These things must hold, however far the system extends, but to assert them is not to enumerate the cases in which they apply nor to define the extent of the system of which they hold. The unity of the system again is not that of a whole defined by limits, but that which consists in the interconnectedness of all causal processes. No knowledge of the ultimate beginning or end of such processes is required. Thought, therefore, does not necessitate a closed system. On the other hand, if we ask, not what thought necessitates, but what ideal it sets before us, it would be true to say that it aims at completeness. Now a complete system as ordinarily conceived is incompatible with infinity. For a system must either, according to the well-known argument, be finite. Then it must have boundaries, and there must be something that bounds it, so that it is not the whole. Or it is infinite, and if so it is never complete. Modern mathematical analysis advances a solution by conceiving the infinite as a whole, which differs qualitatively from the finite whole in that it is similar to its parts. Whether the definitions on which this conception rests are free from all ambiguity, and, if so, whether the conception can be fruitfully applied to the world of experience, are questions which I cannot here attempt to determine. But the conception of the infinite as differing qualitatively from the finite emerges also from more familiar mathematical considerations. These considerations lead us to conceive of series which, as they proceed, approximate to a point at which a certain change of character ensues. This point is the limit of the series which it may be conceived as reaching at infinity. Thus the series .999..., which is a fraction, approaches more and more nearly as we prolong it to the number 1, which is an integer. The arc of a circle, if we take smaller and smaller segments or remove the centre further and further away, approximates more and more closely to the straight line drawn at a tangent. What is common to these cases which run through the entire world of quantity and are the foundation of the infinitesimal calculus, is that a *summation of quantitative changes prolonged to infinity amounts to a qualitative change.* This result may be resolved into three propositions. (1) No quantitative extension of the series yields the change of quality. (2) Every such extension makes the summed-up series approximate more closely to the different quality, and there is no barrier to the approximation short of the limiting quality itself. (3) If such a series represents successive points in a physical continuum, that continuum may extend up to and beyond the limit without any breach in it.

We have seen above how this conception is applied to the division of the continuous. The point is a part of space which dwindles as division continues. At the limit in which the number of points is infinite its dimensions are also zero. That is, the conception has undergone a qualitative change whereby, instead of conceiving the space as an aggregate of points, we conceive it as a continuum. As we touch the limit we reach a new conception. Now whether the result so exemplified in the case of the infinitely little would have similar application to the infinitely great is a further question. But at least, in expecting that we should find infinite space something qualitatively different from finite space, and eternity something qualitatively different from time, we should be moving in accordance with philosophical tradition.

Before considering this possibility further, let us note the bearing of the discussion on the question of the validity of thought and its relation to reality. Whether we accept the mathematics of the transfinite as philosophy, or merely recall what has been said of the development of the theory of the calculus, we have equally to recognise the transformation of conceptions by contact with the infinite. From this transformation we learn, first, that the discrete treatment of space, time and quantity is inadequate. It does not represent and cannot adequately express continuity of process, of motion, of transition, for when we represent space, time, motion or anything physically continuous by a number, we take it at a certain point, not as in process through that point. But, secondly, a method thus faulty in theory could yield results which might be made correct within any assignable limit of error. Thirdly, in vindicating itself against the criticism of its theoretical basis, mathematical analysis advances beyond the discrete treatment, and renders the continuous without error or inaccuracy. Analysis when pushed through corrects its own deficiencies.

These results may be stated generally. A method may be sound for certain purposes though not for others. It may yield a partial appreciation of reality which is just, though it cannot be applied to a final interpretation of reality without contradiction. Thus, methods which enable us to determine that a ball will hit a target, may be vitiated with contradictions if we apply them to interpret the nature of motion. They are founded on certain aspects of motion to the disregard of others. But, secondly, when the flaw is detected, thought is not necessarily helpless. On the contrary, the disclosure of a contradiction is a stimulus to new efforts to overcome it. Thought then at any stage may give us certain facets of reality, and may yet be required to reconstruct its methods in order to deal with other facets, and *a fortiori* with reality as a whole. It is certain that if we are to grasp space and time as wholes our conception of them must undergo a modification. Without pretending to say in what direction that modification lies, we may revert to an old suggestion in order to illustrate the manner in which it might be effected without destroying the accuracy of our ordinary reasoning.[1] Suppose, in accordance with this image, that space is such that straight lines, simply because they are drawn in space, have an exceedingly minute curvature. It is clear that our calculations, based on the assumption of their straightness, might be accurate within the limits of observable error to indefinite extent. They would only not be absolutely accurate, and only when their inaccuracy became important would serious error arise. Suppose, in corresponding fashion, that time, instead of being uniform, has, in reality, an exceedingly small amount of difference affecting its passage as such. Inferences involving the indifference of time would not be affected unless we were considering time as a whole. Such change of conception as these metaphors represent might be necessitated by an attempt to grasp the totality of things, while it would not vitiate the inferences by which we had built up the partial order of actual science.

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[1] I leave the passage which follows as it was written in 1911-12, before the introduction of the General Theory of Relativity.

The new conceptions of space and time which have been introduced since the above paragraph was first written have placed the whole problem in a new light, but have perhaps been more successful in breaking up the hard and fast distinctions of the older view than in substituting a watertight positive conception of the Infinite as an alternative. Neither the conception of Space-Time nor that of a whole which is unbounded and yet finite is free from difficulties, and divergent conceptions of such a whole make themselves evident. I shall confine discussion here to certain considerations which arise out of the conditions under which the conceptions in question are formed and which bear directly on our special problem.

In spite of Kant's denial it seems clear that both space and time are concepts derived by abstraction from objects and their endurance and changes. Dropping all the distinctions among extended objects we are left with pure extension. Any shape, figure or boundary is the mark of some distinctive object, not a limit to the extension itself, but simply some difference within it, which in reducing the extension to pure extension must in turn be dropped. Thus extension runs through all boundaries and in proposing any limit for it we get a contradiction, for the limit is its meeting place with something else that is extended. We thus have the conception of pure space, absolutely homogeneous or 'homaloidal,' and infinite. Similarly dropping all the distinctive characters of events and even the distinction between persistence and change, we get to that which is common to them all and can be limited by no event, since it is also common to the event which tries to limit it, pure homogeneous continuous time. But in conceiving infinite space as a continuum within which bodies exist, and infinite time as that in which process occurs, we are hypostatising these abstractions which we have really formed out of the objects of experience, their characters, relations and behaviour. Reality is not in space and time, but space and time are characteristics of reality. According to the traditional physics they were independent features of reality, no difference in space involving a difference of time any more than a difference in one dimension of space necessarily involved a difference in another. There were three dimensions of space and one of time, any one of which could be separately considered. According to the theory of relativity this independence cannot be maintained, the time of an occurrence being conditioned by its spatial relations. Whether this is true of the occurrence or only of its appearances is a point on which expositions of the theory sometimes seem to be ambiguous. But I shall not attempt to discuss the complex of mathematical and philosophical questions which open out on any attempt to follow up this point. It must suffice that while relativists of course recognise the distinction between spatial and temporal relations they substitute for the common conception of a space continuum and a time continuum the conception of a single spatio-temporal continuum of four dimensions, three of them 'space-like,' corresponding to the three empirically ascertainable dimensions of space, and the fourth 'time-like,' corresponding to the one empirically ascertainable dimension of time.

What is important for us is that the spatio-temporal system appears as a definite structure, a whole unbounded because there is nothing to bound it, but measurable in terms of its parts. The geometrical characters of things are affected by the positions which they occupy in this system, specifically by the neighbourhood of other material things. This result of calculation is generally expressed by saying that space itself is so affected and we are told that space itself is curved, warped or crinkled, and again that space as a whole is spherical, elliptical or perhaps cylindrical. These are very difficult modes of expression because inconsistent with the conception of space formed by abstraction from all such differences. A concept is not other than itself, and having once conceived perfectly homogeneous continuity of extension and called it space we cannot without contradiction admit that anything to be still called space lacks that homogeneity. We are the less able to admit it because however we may be convinced that all real things are subject to curves and twists we, having this old abstraction clearly in our minds, must at once contrast them with it and think of them in despite of warning as curved or bent ' in ' space, or, more strictly, as things diverging in their actual character from a determinate ideal. All reality might be curved like the surface of a sphere and we could legitimately infer that the successively enlarging circles which we describe round a point with radii *as straight as the nature of reality allows* would increase in diameter to a limit and thereafter diminish till the circle again became a point. Yet nothing can prevent us still thinking of our radii as diverging from the ideal straight line of ideally homaloidal space. Our idea of space remains as our idea and not as any other idea. What can intelligibly be said is that it does not correspond to the actual character of reality.

The alternative phrasing which expositions of relativity also employ, that the geometrical properties of bodies are affected by the neighbourhood of other bodies is thus better though it may seem more cumbrous than the statement that space itself is so affected. It may be said that the two phrases come to the same thing. But the one happens to possess a self-consistent meaning and the other does not. It is not the abstraction of space but those real characters of things out of which the abstraction was engendered that are affected. And the real criticism of space is that it is not a homogeneous whole within which things have positions and motions unaffected by its nature, but it is an abstraction from the character of reality as a system of parts which even in respect of these characters are conditioned by one another, and this system it would appear forms a determinable geometrical whole. The actual physical characteristics of real things then always differ, however minutely, from the standard of our conception of purely homogeneous space, and reality as a whole differs more radically in that though unbounded it is not immeasurable or structureless. It is a system with an ascertainable geometrical constitution. This system is nevertheless without bounds for any 'straight' line within it returns ultimately to its starting point as does the great circle on a sphere. Whatever region of space we take is bounded in all directions by other regions of space, yet if we constantly cross these boundaries in a determinate direction we shall at the last find ourselves once more in the region we started from.

Is this conception applicable to time as well as space? Is it a theory of Space-Time or of the spatial dimensions in Space-Time only? There seems to be some difference of view on this point among relativists. Undoubtedly the whole conception, difficult enough to present to the mind in the case of space, is doubly difficult in regard to time. A cyclical view of the temporal process such as has engaged the fancy of some would be an image but only an image under which we might represent the theory. Yet if we were to conceive the course of nature as starting say from some featureless beginning, expanding into the wealth of diverse being, and then contracting again to the drab dulness of its origin, we should not really have one origin, one evolution and one dissolution, but an endlessly revolving cycle in which beginning, middle and end would be repeated over and over again. Our straight-line infinite would be renewed only with a row of circles strung upon it. For an event does not repeat itself, though two or more exactly similar events might occur at different times.

A more concrete way of regarding the matter is to look on the time process as one aspect only of reality. Reality itself is not then in time, but time in reality. Yet neither is reality timeless for it contains time and the whole of time, that is, the whole process of change of which time is only an abstract feature. Now any process of experience may run a definite course from an assignable beginning to an assignable end all the time manifesting more or less completely the total character of some permanent being. The life history of an organism from birth to death is such a process and here it is clear enough that no momentary phase is intelligible in itself, and that we have to look both before and after to understand its significance, that is, the permanent character of which it is a partial expression. It is not inconceivable that all the processes of reality should form a total which should run such a course, and that instead of looking for the cause of the beginning in something anterior in time (a contradiction which is only eluded by the infinite process) we should look for the conditions of the whole process in features of reality which do not come into being by process nor pass out of being at all, but are its unchanging conditions. It may be objected that 'unchanging' is merely the negative of which 'permanent' is the positive, and is therefore an expression implying time, and it must be frankly admitted that when we try to shake off a fundamental category it comes back upon us in the very terms that we use. Yet the meaning of time in a changeless world, or in a world of perfectly harmonious activity in which through unceasing rhythm of change the same life structure should always be maintained, would be essentially different from the devouring creative-destructive time of our experience. Its manifestation would be ἐνέργεια ἄνευ γενέσεως and more particularly ἄνευ φθορᾶς and it may be that this is indeed an adumbration of the real. It is permissible to imagine process as having its part to play in leading from a phase which is changeless because inactive to a phase which maintains itself in ceaseless activity without destruction, the function of process being the mutual modification of elements by activities eventually becoming harmonious. The conception of time as lying between two eternities would then have some justification.

These are extremely speculative suggestions which may be admissible at a time when the hard-shelled concept of the continuous infinite is breaking up. They are not conceptions on which any positive theory could as yet be founded. But they do suggest that the traditional contradiction between infinitude and wholeness is not insuperable.

However this may be our present question concerns the validity of rational methods of interpreting experience. Such methods undoubtedly point to a complete system. But we must distinguish between a goal which is certainly not attained and a basis of operations which must be firm and solid before we start. If we had to postulate the possibility of a completed system as the foundation of any inference the possibility of rendering it adequately in conception would be fatal. But if such a system is an ideal to which we may approach by repeated reconstructions of thought, no existing difficulty in representing it is an argument against the claim of thought to yield a partial representation of reality. More generally, if there could be no knowledge of reality but that which is final and complete, there could be for us none at all. The whole contention of the experiential method is that knowledge is partial and approximative, and that it advances by constant correction, not only of its results but also of its methods and principles. We may know the part without knowing the whole. We may know it approximately without knowing it accurately. Our interpretation of it may be good for the purpose of such partial knowledge and yet liable to final revision in relation to the whole. The methods by which we have arrived at it may be sound methods of dealing with the part, though inadequate to an understanding of the whole of things. Fallacies and contradictions arise when the partial character of knowledge is overlooked. But there is no contradiction contained in experience as such or inherent in the method of interpreting reality by the correlation of experience.[1]

7. We were led into a discussion of the Infinite by our examination of the fallacies to which we are prone on the use of analysis. What was there said of the physical continuum applies without essential modification to the

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[1] We return to the question of the validity of the rational ideal below. Chap. III. p. 316. Chap. VIII. pp. 423-430.

continuous, or at any rate, exceedingly subtle and gradual variations of character which the real world presents. Here, again, common sense, guided by practical interests of correlation, gathers together a certain section of experience under concepts, which thus possess, not so much an exact fixity as a certain range of meaning. This laxity is intolerable to abstract thought, which, accordingly, selects some particular case and hardens it into a type, to which any new case must either conform or not conform. As an alternative, using experience but using it badly, it takes an instance falling under the concept and (since the concept is assumed to be one and indivisible) asserts anything that it finds in this instance of the concept as such. Thus with the aid of dialectic on the one side and false analogy on the other, abstract thought confronts experience, as it were, with a number of alternatives, whereas the reality presents itself rather as something that moves continuously from one alternative to another. In this relation the legalistic type of mind commits its worst errors, and again the remedy is the closer correlation of the concept with experience. For the bare alternative, A is B, or A is not B, is substituted such a concept as is symbolised by a curve in which every variation of B to the limit of zero is contemplated, and advanced thought in most departments may be rendered by systems of such curves. The economy of thought begins with the discrete, but the back stroke of experience drives it to make its account with the continuous.

Another family of fallacies derives from the relation of whole and parts in the organic order. In this order a whole is never a mere sum of parts, but involves such mutual actions and modifications among them as will upset our calculations if we seek to reason from the parts as self-subsistent entities. The crudest form of fallacy here is to take the sum of parts for the whole. A slightly more refined error is to take the organic character as an extra part added to the others, possessed of mysterious efficacy and acting in an ill-defined manner among the rest. Thus the behaviour of living beings has been partially resolved into a complex interaction of mechanical forces. One school in consequence assumes that it has only to pursue the same methods further in order to make the analysis exhaustive. Others crystallise the differences between mechanical and vital processes into a separate substance which interacts with body and perhaps has its seat in some problematical region of the brain. Others again infer somewhat prematurely, that the characteristic phenomena of life are hidden from our intelligence and can only be felt and perhaps made a subject for poetry or rhetoric, but never for systematic study. If we let ourselves be guided by experience, what we find is that the behaviour of living beings diverges from the mechanical model in that it is constantly adapted to the requirements of the whole. To ascertain the precise nature and conditions of this divergence then becomes a purely empirical problem, but to state it squarely is to recognise that the character of each and every part is modified by the whole to which it belongs. The analytic view which resolves behaviour into its ultimate elements has then to be corrected by the synthetic view which accounts for each element by its place in the whole. The peculiarity of the organic character lies not in one specific part but just in its wholeness.

8. At the present time there is no danger that the errors incident to abstract thinking will be overlooked. On the contrary, all the tendency is in the opposite direction, and insistence on the rights of instinct, feeling, emotion, and the concrete practical interest is pushed to the point of considerable scepticism as to the scope of articulate thought. The tendency in the hands of thinkers must be suicidal, for thought is nothing if it abandons the attempt to be distinct, connected and articulate. It may, indeed, be questioned whether all modes of reality can be articulately rendered. Those who maintain the negative, whether on the ground of some inherent irrationality in things or of the limitations of thought, prepare for themselves serious metaphysical difficulties. It is not for the rationalist of all men to brush aside such difficulties by an *a priori* dogma, but it is permitted to him to examine the

grounds on which they are alleged. And these in fact seem closely connected with the tendencies to misuse of analysis which have been described and with certain further confusions and even prejudices for which there is less excuse. Thus in relation to the question that has just been considered of vital processes, it is maintained that life is a fact with which analysis fails to deal. It cannot be resolved into mechanical forces and therefore cannot be the subject of scientific treatment. There are here two confusions which I believe to be the main ground of the case against rationalism.

That the vital processes must be ultimately of a mechanical character and that they are capable of scientific treatment are in fact two quite different propositions, and the first confusion consists in identifying them. The second proposition, which alone is essential to Rationalism, assumes, no doubt, that they can be clearly and adequately conceived, and it implies that so far as they are complex they can be resolved, by methods familiar to science, into simpler constituent factors. It does not, however, imply—and this is the second confusion—that they contain no element which is unanalysable. On the contrary, it may always be one of the results of analysis to exhibit certain lowest terms as the final products of its work. All that is necessary for accurate knowledge is that these lowest terms should be definite elements clearly presented to the mind. As long as we can justly apprehend their nature, trace the combinations into which they enter and their behaviour therein, and record the difference which their presence makes in our world, they are subjects not merely of knowledge but of the systematic and consecutive investigation which we call science. But, the objector may contend, these unanalysable data, if they are to be the subject of scientific treatment, must be of a mechanical character, and lend themselves to mathematical computation. This is in substance to identify science with mathematics. But for this identification there is no warrant in the postulates of thought. These postulates no doubt lay down that anything that exists must have its place in a system of relations which, when adequately defined, will be found to hold universally. But they say nothing whatever as to the character of those relations, and the conditions of universality and necessity do, in fact, attach as clearly to the means which serve an end, or the functions which together maintain an organic whole, as to the mechanical sequence of cause and effect. The view that Purpose, Value, the whole world of Mind—that which owes its discovery of mechanical laws to its ideal of order—is itself rooted in disorder, is due to an imperfect development of critical method. It may be added that this view becomes a paradox which verges on contradiction when it is suggested that the mind actually implants the order that exists in matter, while remaining in its own nature essentially anarchical.

Analysis then is not necessarily destined to resolve everything into terms which can enter into a mathematical equation. Nor does analysis express the entire movement of thought. It may be said to have a direct and an indirect function. Its direct function is to clear up what is obscure and distinguish what is confused. Thus we resolve an ambiguous or cloudy conception into two or more distinct, though allied, conceptions of definite and constant meaning. For instance, a familiar economic analysis resolves ‘ profits ’ as popularly conceived into elements of interest, rent, earnings of management and so forth. The work of analysis is here closely parallel to that of careful discriminative attention in the field of sense perception, which, as we look closely at a picture or long and carefully at a view, brings out lights and shadows, outlines, ridges and valleys which go to make up the content of the original perception but are not at first distinctly perceived. So far, analysis merely helps to make the field of consciousness clearer, and it is not suggested that in so doing it disturbs, mutilates or omits. The second function of analysis is indirect. It serves as the basis of comparison, and generally of interconnection. Thus, a piece of country is roughly of triangular shape, and having noted this we are able to apply to it the properties of triangles. Here it is that there is danger of mutilation. The actual surface will not be a perfect plane triangle bounded by three straight lines, but will exhibit irregularities of greater or less importance. In leaving these irregularities out of account, we open a door to error, and it is only by a critical use of the method and the correction of one inference by another that we avoid fallacy. In this usage analysis is the servant of correlation. We break up our concrete, individual experience into elements in order to appreciate the general relations that pervade it. Experience as it comes to us always has its individual character. Even a green or blue colour has in each case, where we see it, its peculiar shade, intensity and quality. But in noting and naming it as green or blue, we assign it a certain place in the colour circle. We note the point in which it resembles all other objects that are green or blue and we are able to predicate of it certain things, as, *e.g.* that it is at the opposite pole from red or yellow, and to communicate something of its character to anyone who has not seen it. What we say of the object is true though it is not the whole truth, and it is important, because it is the means of bringing the object into relation with objects already known, by subsuming it under an idea which has its place in a system of ideas. Analysis, that is to say, is the basis of the general relations by which we discover system and interconnection running through or, if we prefer to say so, underlying our experience. In the actual process of thought there is, of course, a reciprocal action. Analysis is the basis of comparison and it is also suggested by comparison. We note a certain character in a man's face, perhaps for the first time, when we learn that he is the near relation of someone we already know. It is equally possible that we might have been struck by the character and so been led to enquire into the relationship. Our point, however, is simply, that whatever its genesis, the distinct element in the content is the basis of the relations which we discover between different contents. The element which, whether with the aid of much or little or no analysis, whether by much or little abstraction of surroundings, is rendered clear and distinct, is the unit of correlating thought, the basis of the relations which interconnect all elements in the world of experience. Thus, to be clearly conscious of anything is to be in a position to correlate it, to appreciate its relations with any other thing.

Now the impulse to such interconnection is another name for the rational impulse itself. The rationally grounded belief is a belief which is at least seen in connection with others, as issuing from or justified by them. This is the ground of its opposition to the irrational belief, which is so called either because it contradicts others which we still hold, or because it stands alone as an arbitrary dogma which we choose to lay down and do not trouble to prove. But to connect one element of experience with another, we must first distinctly apprehend the elements themselves. The analysed element is the unit of the connected or rational system. And unless analysis is to be an infinite process the ultimate units must be not further analysable. That there should be a limit to analysis then can be no bar to rational reconstruction. It is when we take an imperfect analysis for an exhaustive statement that fallacies arise, and it is probable that the attack on rational method confuses the defective analyses of our actual thinking with the limits that there may be to analysis in the nature of things, and so imputes the fallacies into which we may be betrayed by reasoning from insufficient data to inherent defects of the rational method itself. It is in face of failure of the best analysis that we can make to give full intellectual satisfaction that conflict arises. There is always more in our minds than is brought clearly before consciousness, for, as we have seen, racial experience is acting within the individual mind from the earliest stage but acting massively so as to produce certain broad resultant effects, not articulately so as to correlate relevant point with point.

9. But it is probable that the current tendency is based on the failure of analysis in certain specific instances, for example, in the analysis of beauty, in the reduction of life to mechanical elements, in the explanation of the religious sentiment in terms of experience. On such occasions two opposed fallacies regularly find adherence. One party maintains the sufficiency of the existing analysis. Another,

convinced of its inadequacy, insists on the discrepancy between the living reality and the deadness of abstract thought, and exaggerates it into a chasm that never will and never can be passed. The element of mystery, the dim halo of the uncertain and inarticulate, the obscure and the primal, is for this way of thinking just the one thing that matters. The attempt to explain, nay, even the attempt to state a meaning in frank and unambiguous terms is resented as a violation of the sanctuary. Thus popular thought wavers between mechanical abstraction on the one side and mysticism on the other, the one, to adapt a famous antithesis, relatively void, and the other blind.

In point of fact there always is in experience more than thought can render in articulate terms. This holds of a very simple experience. Even one of the colour sensations to which we referred above has a quality which it is difficult, if not impossible, to render quite perfectly in abstract terms. The green of the oak leaf is a green of a particular shade and quality. We express this quality as far as we can by calling it a darkish green, shading to a slight suggestion of blue when the leaf is fully out. But it is difficult to give it its precise quality without calling it the green of the oak leaf, which is after all a definition in a circle. 'Green,' 'dark green,' 'bluish green,' are, in fact, general terms which, with a varying measure of accuracy, express the character of the colours that we see. By attention and comparison, by trained perception and analysis, we can keep on increasing this accuracy so that it approximates to the limit of the concrete sense datum. Hence the painter's colour vocabulary is richer, and more diversified with shades of perception, than that of ordinary language. As the process of analysis advances so the rendering of experience becomes more perfect, and the element of error inherent in the translation of experience into thought becomes less and less material. Naturally, the more complex and subtle the object which we are approaching, the more backward we are in this process. When we are dealing with something like the sense of duty in which a thousand subtle threads of feeling are involved, but which is always pre-eminently a unity and destroyed by any breaking up of its elements, the task of analysis is of far greater difficulty. When, again, we are dealing with the nature of life, we are attacking that which for the most part is only known to us directly by certain superficial effects. Direct observation of the inner processes fails, and any conception that we form can only be the result of a prolonged effort of synthesis applied to very diverse and always insufficient data. Lastly, when we consider religious conceptions, we are dealing with the entire attitude of men to life and the world, an attitude which is, in fact, the expression of their total heredity and their total experience—likely therefore, one may say, to be of all things the last to receive satisfactory shape in explicit thought, and yet incapable of taking distinct shape and performing its functions effectively except through the medium of explicit thought. In such a case as this, we might, indeed, seem in sorry plight, compelled to choose between inadequate formulae or an ineffectual vagueness, were it not that thought is not fixed but plastic, that it corrects its own errors, and if allowed freedom of movement, shapes itself stage by stage to the requirements of the reality which it seeks to interpret. Throughout the process of growth, both the parties to whom we have referred will have a measure of truth on their side. On the one side, articulate statement is necessary if thought is to advance at all, and it is only when certain elements of experience are made explicit that we can begin to see how much remains. On the other side, the adequacy of any given analysis is justly subject to searching criticism, and the ‘ mother-sense ’ has a right to express and to maintain any dissatisfaction which it feels. But both sides have also certain natural tendencies to fallacy. Analysis takes the part for the whole, or forces complex and subtle experiences into the harder and simpler categories with which it is more familiar. Feeling, on the other hand, sometimes opposes analysis altogether, and at others solidifies itself into some explicit dogma or doctrine, the proof of which would really lie and could lie only in the province of thought. This is the most fruitful of all sources of confusion. The real force behind a dogma is a mass of feeling that has never been analysed, never left its home in the mother-sense. But this feeling is not so strong as to be happy without the appearance of evidence and reasoning. It spins such evidence and reasoning, accordingly, out of the first materials that come to hand, and invests the flimsy web with its own intensity of emotion. The only element of assured truth in the whole matter, as analysis disentangles it, is the feeling in the background. This feeling is so far entitled to respect that it belongs to the mother-sense, that is to say, it has grown up in response to requirements of the environment, but how it is to be interpreted in detail, is unfortunately not to be judged by the simple deliverances of consciousness in which it issues. That experience is narrow and incomplete is not a reason for ignoring it altogether, but rather for seeking means of extending it. That analysis is imperfect and may be fallaciously used are not reasons for reverting to uncritical dogmatism but for still closer criticism of assumptions and in particular for a careful consideration of the general relation of explicit thought to underlying mental conditions. For if, as has been said, there is always more in our minds than is brought clearly before the consciousness the cause lies in those genetic conditions which it has been our business to trace. Racial experience has been acting within the individual mind from the earliest stages, not as a system of data of which we can take the measure, but as a system of unknown and unthought-of conditions by which the mind is shaped.

The whole history of the growth of mind as traced by Comparative Psychology, turns on the relation of the conscious life to these underlying forces, and from one point of view the course of development may be said to consist in the steps by which they are brought into consciousness, and that again means in the end the steps by which they are distinguished, analysed and so articulately compared and brought into relation. We have, in fact, seen in the course of our brief sketch how each new stage may be regarded as the coming to light of some factor which was before working in the dark, the rendering explicit of that which was logically implied. The shrinking feeling that is not yet a distinct anticipation of pain, is yet, for the onlooker, a testimony to the pain that has actually been felt and has left its mark. The inference, the practical adaptation of an act to a purpose, for which no logical justification could be given, implies the operation of that which, if it were conscious, would be recognised as a general conception, and the operation of general conceptions rests on rational pre-suppositions which only the highest stage of reflection brings to the surface. Thus in every stage of conscious development there are at work forces of which an explicit account is given only at the next stage, and as the stage advances these forces become dimly conscious. Darkly and obscurely they rise on the fringe of the lighted area, and their development into explicit ideas is capable of being traced. So in the history of human thought reasons can be found *ex post facto* for customs and beliefs for which those who held them would give no reason or a wrong one. Magical beliefs incorporate sound social ideas, and the religions teach duties and inspire ideals which are often justified by the reason which rejects the dogmas that first taught them. The working of the unconscious does not cease as the sphere of the rational advances. If the area of our knowledge extends, its line of contact with the unknown is also widened, and we cross the frontier not less often, though with greater caution and perhaps with more fruitful result. The more thought becomes conscious of itself the more clearly it must realise the limited extent of the area which it has actually and definitely reclaimed, and the less it can refuse to acknowledge any value in the obscurer and inexplicit promptings of forces that lie beyond its ken. In these circumstances there are three royal roads to fallacy. The first is to regard explicit analysed articulate experience in its existing incompleteness as the sole and sufficient measure of reality, and to dismiss the world of poetry and art, of religious emotion and enthusiasm to a limbo of beautiful imagination. The second is to despise the articulate and abandon the effort to extend its sphere. The third and commonest is to take as articulate truth that which has its foundations essentially in the inarticulate. The feelings which emerge into consciousness clothe themselves in the form which they find at hand. They take up the body of traditional ideas that lie nearest to them and clothe themselves therewith, not as with a garment but rather as with something that becomes one with themselves. In this process we have already seen the true psychological energy that upholds dogma, and we have seen also that the method of rational criticism is to separate out the feeling from the form which it takes. The mass of impulse and emotion, the body of needs, explicit and obscure, that make up the religious feelings of man, have roots that run deep in our nature. Whatever their source they are as feelings real and vital. We must at lowest, admit their existence as facts and their importance as forces. We shall, if we are guided by the conception of mental growth as comparative psychology reveals it, go a step further. We shall treat them as indications of a deeper phase of reality which we are only beginning to understand. But we shall also, on the same grounds, resolutely decline to accept as valid the ideas with which they unite themselves. For the explicit idea the logical ground is experience, shaped into thought by processes which can be rendered explicit and justified by rational tests of mutual coherence. Feeling, as such, is no logical or self-consistent support for a belief, and for the extension of our assured knowledge there remains only the one method of the expansion and improved correlation of our experience. This process will, if the source of a feeling lies deep in the realities of our nature, of itself bring that source step by step within the circle of knowledge. It will get at the true implication of the deeper experiences as it has reached the roots of those that grow nearer to the surface. Thus, the work of reason appears unsatisfactory, because, at any stage, there is more working in the mind than can get itself clearly expressed. The world of mind is not irrational, but at any stage short of its perfection it is imperfectly rational. The mind at any such stage is more than Reason. Yet Reason is not a separate faculty, dominating one compartment and legitimately excluded from another on which it wrongfully encroaches. Nor does it aim at an aggression which is to domineer or destroy. The weakness or defect of reason is equally the weakness or defect of the non-rational elements. Its extension to them, their inclusion within its sphere, is their redemption. Its legitimate empire is coextensive with Mind, for every feeling, impulse, and even fancy has its legitimate meaning and true development within the harmonious whole towards which it moves.

CHAPTER II

RATIONAL RECONSTRUCTION

1. *The Place of Hypothesis in Science.*

So far we have dealt with the criticism of conceptual thought as an organ for the interpretation of Reality. We have refused to admit any inherent contradictions in the method or any insuperable limits to its range. We have argued that objections arise out of fallacies incident to the separation of the conceptual order from the experience out of which it arises. The very distinctness of its elements thus divorced from their basis tends to harden into a rigidity which distorts the truth. Conceptions are falsely used if treated as tests of reality, or as self-existent, or as containing their evidence in themselves, and this usage is the basis of the separation between the world of thought and that of sense, or between Reality and Appearance. Their uncritical employment, again, engenders a certain materialism when use is made of the most clearly definable conceptions as the measure of things, and by reaction from that method, to mysticism when the unanalysable elements of experience are endowed with a special sanctity and divorced from the conceptual order; to dogmatism when that which is at best but obscurely felt is treated as though it were explicitly known, and to a dogmatism of negation when the partial character of analysis and of experience itself is ignored. While the metaphysical attempt to reconstruct Reality out of categories fails alike in its idealistic and materialistic forms, the reversion to mysticism or dogmatism is not justified.

The defects of the conceptual order are not due to eternal and immutable limitations of thought, but to faults in its operation which may be overcome by critical consideration of the function of the concept as interpreting experience. This leads at once to the question of the right methods of forming and interrelating concepts. From a partial, mobile, fluctuating experience there is somehow evolved the stability, uniformity and apparent necessity of the conceptual order. The more clearly we realise the dependence of the conceptual order on experience, the more we understand that its function is to co-ordinate the world of which our experience is typical, the more we must be struck by the contrast, and the logical difficulties that it involves. In general terms, how can a partial experience become the valid basis of a knowledge which extends indefinitely beyond it?

The question becomes the more urgent in proportion as we recognise how narrow are the limits of experience strictly defined. For your experience is not mine, nor mine yours, and in utilising the experience of others we are already committing ourselves to a system of inferences and implications as to the credibility of testimony and so forth, to face which is to realise that any such expression as the experience of the race may be a convenient and compact form of expression, but does not stand for anything that is pure experience denuded of inferential assumptions. If experience is the only trustworthy basis of knowledge, it must be understood that for any one of us it is ultimately his own experience that is meant. But, furthermore, his experience comes to him as a constantly moving stream of change, passing away and partly forgotten as it goes. His knowledge of the past, to say nothing of the future, is at any moment a thought, a judgment that goes beyond the experience of the present, and that judgment is liable to err through defect or confusion of memory. The picture that he has even of his own past is not a simple and straight forward reproduction of that which he has actually lived through. Memory is not a cinematograph. It brings together mutually relevant data, it selects and rejects. It analyses and constructs.

Pure experience then, in the sense of the sum of the contents present from time to time to consciousness, is only a material on which the mind works, and it is for any one of us a slender material relatively to the wide range of our thought.

What we have to enquire then is by what methods thought treats this material and whether these methods are valid? The broad answer to the first question is that thought acts on its material, (1) by decomposing or analysing it into elements, (2) by bringing different elements together, without being necessarily confined in so doing to the empirical order, (3) by taking the relations which it so finds under certain conditions as true of reality in general, and (4) by comparing its results and correcting them one by another. The broad answer to the second question is that this process of correlation and correction can be so adequately performed as to yield results which, in their general application, will hold true.

2. The central difficulty here turns on the conditions of valid generalisation. We have no *a priori* guide on the point, for, in fact, simple and uncritical generalisation goes far beyond the limits of certainty. We do not learn to generalise as some have thought. We learn not to generalise as often as we wish. What conditions of generalisation then may be held valid, and why? The difficulty of finding any satisfactory reply to this question has been the persistent stumbling-block in the way of any theory of experiential reconstruction. In particular, it has led both in the theory and in the practice of science to a view which would confine valid reasoning to deduction and allow to experience only the secondary function of corroboration. Reasoning being thought of as essentially deductive in character must be based accordingly on first principles which cannot be proved. But it is admitted, that while there may be some first principles which are true axioms, needing no proof, there are others which at the outset are mere assumptions, taken up for the purpose of seeing what flows from them. These conclusions can be tested by experience, and if there is agreement, the assumption on

which they depend stands uncontradicted. It may be true. If further results are elicited and the agreement with experience continues, it becomes difficult to believe that an assumption which works so well can be false. When it has stood very wide and complicated tests, we need not trouble ourselves to question it further. We may take it as true. This is the only way by which experience can establish a generalisation. Any such generalisation is at first a hypothesis, and in proportion as its consequences are found to conform to fact it becomes a recognised theory.

But though this account is a fair description of what is often the course of discovery, it is in no sense a theory of proof, since it involves the fallacy inherent in the 'inverse' method. If the hypothesis is true, certain observable facts will follow. They do follow, therefore the hypothesis is true. This is inherently bad logic, and the theory that there is no proof obtainable from experience but this is the parent also of much bad science. That discovery should follow this course, that scientific explanation should take this form and that scientific men should shut their eyes to its defects as logical demonstration, are all equally natural results of the position of our experience. We are conscious that it does not, as it stands, yield us the fundamentals of reality, but is an effect or appearance of a more deeply set real order. What, under these circumstances, is more natural than to go outside experience, to make a bold conjectural attempt to seize on some of the fundamentals of the real order, to take up this position as a point of view from which experience will become intelligible, to reason out—as one only can reason from the centre—what effects must follow, and if they coincide with that which we actually find, to rest assured that it is no mere coincidence, but the hand of truth? All this is, we say, natural, but that does not make it less fallacious, it does not prevent brilliant hypotheses from acting as mere will-o'-the-wisps, nor does it yield a true account of those which have had a more fortunate history.

A brilliant critic of modern scientific hypotheses has summed up the contrast between the historic fortunes of two different classes of theory in the dictum that 'laws of nature are enduring, hypotheses are perishable.' Yet laws of nature are themselves first attained in a tentative way; that is to say, they begin their career in hypothetical form and they often undergo some modification before they set into their permanent shape. What distinguishes them is that though tentatively formulated on the inverse method, they are proved, not by that method but by direct induction; that then (at least in the sphere of physics) they are capable of being put in mathematical form, and that in that form they can be corroborated by correlation with similar generalisations. The hypothesis, which goes beyond that which can be legitimately generalised from experience, has another origin and a different fate. Ordinarily it contains some sound generalisation within it, but at the same time it endeavours to explain this result by means of some concrete image which is intended to reconstruct the reality on which the result depends. Thus, the same critic points out that the old conception of light, as due to material or quasi-material particles, emitted in straight lines and rebounding from plane or curved surfaces, in accordance with the laws of elasticity, gave a concrete representation of the behaviour of light which embodied, suitably enough, the phenomena in which investigators were then interested, but which, outside the truth which could be accurately generalised from observable data, possessed no validity. The facts of refraction and polarisation necessitated fresh assumptions to make the mechanical model agree with the working experience, but at the same time suggested an alternative image of an etherial medium capable of undulatory movements. This theory was so successful as not only to accord with known facts, but also to give rise to predictions which tallied with subsequent observations, while a crucial experiment yielded results which disposed of the rival hypothesis and coincided with the conclusion deduced from the undulatory theory. Nevertheless, logicians like Mill protested from the outset that such coincidence amounted to no proof, and in point of fact, the undulatory theory has given place to a conception of transformations of energy in a medium, the alleged properties of which still present extraordinary difficulties.[1] Professor Ostwald, however, appears to be justified in maintaining that the later tendency is to remove the hypothetical elements and to pare down the theory to a point at which it 'approximates to a correlation of the actual facts destitute of hypothetical elements.' We may believe that the electro-magnetic theory of light has still a long path to tread before this result will be consummated, but Professor Ostwald has well stated the general course of development for theories of the kind. So far as they give rise to new experiments they serve a purpose, but while experience expands, the theory itself is narrowed until the two meet, and what was a hypothetical account of underlying reality—and as such, doubtful and pregnant with fallacy—becomes a descriptive generalisation of the phenomena of the laboratory or of the field, embodied in a series of mathematical equations.

The law of Gravitation, again, is constantly taken as a perfect example of the success of the hypothetical method. Yet Newton himself said, 'hypotheses non fingo,' and his critics have not been sufficiently careful to examine what he meant by this disclaimer. Newton, of course, used hypothesis in the sense that he tried the result of calculating from certain suggested forces, that when the result did not appear to tally with experience, he dismissed it, and that when improved methods of observation showed that it did tally with experience, he accepted it, and regarded his theory as proved. But what exactly was proved? Not the nature of gravitation—as to this Newton had no hypothesis—but the conformity of the earth and planets to the modes of motion discernible in the behaviour of bodies on the earth's surface. The ultimate cause of this action was not only not demonstrated by Newton, but is in fact still to seek. Newton's so-called hypothesis is an extension or generalisation of the motions of bodies from the terrestrial to the celestial, an extension at first tentative and then confirmed by the perfection of calculation and observation.[1]

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[1] Written in 1911. Whether the ether is to be allowed to survive at all is now, as we all know, a matter of controversy.

All sound hypothesis, I would venture to say, falls back on this method, though it may not begin with it. Thus, Darwin made a new epoch in biology because he assumed only such causes of variation as were known—the selective action of breeders, as he understood them—and his argument went to show (*a*) that a partially though not wholly similar selection was at work all through organic life, and (*b*) that the cumulative action of such selection operating through generations would explain the facts of the organic order. Had Darwin been able to carry through his argument with the precision of Newton, he would equally have proved his theory as a generalised extension to the whole range of organic life of that which can be seen at work in some phases of organic life. The true criticism of Darwin came from those who demonstrated (*a*) the insufficiency of the kinds of variation and selection of which he had knowledge, and (*b*) the existence, as a matter of verifiable observation, of other kinds of variation. None the less, Darwin's method was sound because it rested on empirical generalisation. So also is the method of those who rely on experimental breeding or on microscopic examination of the structure and structural changes of the germ cell. When in the pursuit of this method the point is reached at which elements in a germ cell are assumed which cannot be observed, and modes of interaction between them are postulated on the ground that if assumed, they would give the results which we actually find, we are once more back in the hypothetical region and we find theories which do not directly square with facts requiring supplementary theories to adjust them, and the whole web seems likely to require transmutation after transmutation until the progress of observation shall determine what actually happens.

3. On the other hand, to limit the work of science to the

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[1] On the new theory, Newton's formulae still hold to a very close approximation, but as a particular case of a general law which is radically different from his.

accurate and compendious description of observable data is to be carried too far in reaction. A theory necessarily aims at something more than the exact description of what it finds. It aims at generalisation, that is, at inference which will enable it to say not only what is found, but what will be found, or would have been found by observation in the past. Such generalisation is secure in proportion as it rests on knowledge of causal interconnection, and to know the causes of things is to know their real nature so far as it is relevant. If science contains any adequately grounded generalisations, science is something more than a knowledge of phenomena. But the descriptive or phenomenalist view when pushed through tends to whittle down its laws to abstract equations applicable only to an ideal world, and concerned with the order of perception only if certain elements in that order happen to correspond to the concepts. Indeed, as thus treated they are in danger of being reduced to tautologies. Consider, for instance, the famous equation which lies at the centre of modern physics, and is known as the law of the conservation of energy. This law is expressed in the form of an equation between forces acting upon a body over a certain space and the change of velocity called the acceleration of the body, achieved in that space. The equation informs us that the force multiplied by the space through which its point of application moves, is equal to half the square of the change in the velocity multiplied by the mass of the body on which the force is acting. As a generalisation applicable to forces and bodies conceived as real entities this equation has the most far-reaching results, but when its terms are defined as analysis requires, it shrinks to very small dimensions. For a force, we are told, if by the term we are to describe what we can see and measure, is nothing but a name for the rate of acceleration of a mass. If this definition is accepted the equation is seen to lie between the rate of acceleration of the mass and the velocity achieved by the mass when the acceleration is continued through a certain space interval. Of the difficulties connected with mass and the modern transformation of this concept I need not speak. I point out only that we began with the conception of an equation between 'impressed force' and a resulting acceleration, the balance between that which is expended on a body and that which the body has to show for it. We then learn that the impressed force cannot be scientifically defined except in terms of the rate of acceleration, and all that our equation shows is the relation between this rate and its result. In this form it acquires mathematical certainty, but it tells us nothing of the action of bodies on one another. Yet, when it comes to be applied, this limitation of its meaning often appears to be forgotten. Force, instead of being a rate of acceleration, appears to consist in pressures, impacts, strains, stresses, and the equation figures as a law of the material universe from which the most far-reaching deductions as to the origin and destiny of things can be drawn. In short, in science as in metaphysics there is tendency of ultimate principles to play a double part. To obtain certainty of proof their terms are fined down to a point approximating to tautology, to a point in which, at best, they express the mutual relations of certain concepts. To obtain meaning and width of application the same terms are again expanded to cover the real working of forces that may be but imperfectly seen and known, and are by no means to be controlled by human definitions.

4. What may be called the Hypothetical stage in the development of science moves between two poles of fallacy. In its assumptions about the real nature of things, it goes beyond its warrant, and commits itself to that which its inverse method cannot prove. If to escape this it fines down its concepts to elements which can be educed from experience by analysis, it relapses into a mere construction of a conceptual order with but a casual and uncertain application to reality. So far as it oscillates between the two points of view, it falls into sheer fallacy, and so far as it confines itself to the description of what is given, it abandons the attempt to construe the real order.

At its best the inverse method is an advance on the self-criticism of categories, because it requires the systematic test of experience. But to obtain proof we must go a step further, and frankly base our beliefs upon experience itself. But simple as this sounds, and familiar as the method is in the trivial operations of every-day life, to carry it through as a theory of knowledge, and to make experience as a whole the basis of our view of reality as a whole, is the most complex of all tasks, requiring the maximum of self-criticism in the use of the method, and open at many points to the charge of paradox and self-contradiction. If, indeed, as some of the critics of the hypothetical method have supposed, the object of science were only to describe what we see, the theoretical difficulty would disappear. But if its business is to generalise and infer, be it only to the past and future of our experience, the case is quite altered. Such inference, we have admitted, must be based on a measure of insight into the real causal processes whereby things are determined. But, to assume for the moment that experience gives us reality, how are we to know that it gives us enough of the reality for this purpose? Consider only the relativity of perception. By means of the microscope we know enough now to be sure of the negative truth that the causes of zymotic diseases could not be discovered by any analysis or synthesis of data yielded by the unassisted senses. What reason have we to think that the larger scope afforded by the microscope will carry us any further in the way of ultimate laws? If we rely on observation we never observe the *whole* of any phenomenon, and there is always the possibility that what is necessary for our purpose resides wholly or in part in the processes which are unobservable. We are brought back, in short, to the initial difficulty, that the world we can touch and see is but a fragment. The results of real processes are visible therein, but we cannot assume that the process as a whole comes within our limits. We may be able conceptually to construct a reality which would yield our results, and this, in fact, is what the inverse method attempts. But to invert the process again and make the results the basis of the construction is a much harder task. It can be fulfilled only if we can answer the two questions set out above—under what conditions is generalisation valid, and why under these conditions do we hold it valid? To determine these questions we shall have to consider what we mean by a valid process, and assuming that what is valid commends itself to our reason, we shall have to ask what is the true meaning of the term rational.

5. We may obtain some light on the question by asking, first, what is irrational? Two types readily suggest themselves. There is, first, the inconsistent. It is irrational to maintain contradictory positions. There is, secondly, the arbitrary, and of this we may distinguish two cases. (1) Negatively it is irrational to maintain a position without reason assigned. (2) Positively it is irrational to maintain it on grounds of emotional feeling, because we choose to maintain it, or from any cause proceeding from our own peculiar mental make-up rather than on account of the intrinsic character or relations of that which is asserted. Both these rules, however, present great difficulties. (1) To the first it may be held that there are at least some exceptions. It is a possible view that there are some self-evident truths—truths, therefore, which may be maintained on no other ground but that of their inherent character, and it may be urged that the bare conception of a 'ground' implies truths of this nature. For let us admit that it is unreasonable to make or maintain any statement or position for which no grounds could be assigned. Then if any proposition is not self-evident, the 'grounds' on which it is asserted must, it would seem, involve something further than anything contained in the original position. This is as much as to say that what is maintained must be somehow connected with what is otherwise known or thought, and that to reason is, in the very broadest sense, to interconnect. But this at once raises the question of the ultimate goal of interconnection. If it be admittedly arbitrary and irrational to advance proposition A without some ground, is it made reasonable when such a ground is discovered in proposition B? Does not B in turn require justification, or if we take the two propositions A and B as now forming a connected

whole, does not this whole stand equally in need of something further to substantiate it? If so, we shall need a third proposition C, and we shall be no better off, since as soon as C is asserted the same question will revive. Thus we are threatened with an endless series in which, though always proving, we never get any nearer to the grounds of proof. From this there are two possible ways of escape. One is frankly to admit exceptions to the general requirement of proof—to recognise the existence of self-evident first principles, to trace other thoughts, judgments or affirmations if we can back to these, but to treat the principles themselves as self-evident. But this method has its weaknesses. To begin with self-evidence is a term of doubtful import. Taken quite literally, it suggests that the evidence is in the truth itself, and that it is an objective quality, say, of a relation between two terms which the truth expresses. If any truths were so stamped or hall-marked with inherent certainty and primacy, they would, indeed, occupy a peculiar position. But the bare conception of 'evidence' implies a mind which is convinced. Even if the hall-mark were there it would not be a mark of self-evidence unless there were a mind to which it appealed. If so, two factors at least go to the composition of self-evidence. It is not the simple and unanalysable thing that it appears, but depends (*a*) on the character of the relation asserted, (*b*) on the mental make-up of the thinker who forms or accepts the assertion. Now the mental make-up may be affected by much that is external and accidental. In the judgment of value in particular it is coloured by emotional elements, prejudices, interests, sympathies and antipathies that together form a very composite whole. This whole may react upon a very simple proposition with an affirmation or rejection of luminous intensity, endowing the response with a strong feeling of subjective certitude. But this felt certitude—felt by the mind in making the affirmation as due wholly to the intrinsic character of that which is affirmed—will, in fact, be attributable to an intricate maze of psychological forces, and to assume that those forces necessarily guide the mind to truth is to take a great deal for granted.

Owing to the psychological complexity underlying felt certitude people do, in fact, differ largely in their opinions as to what is self-evident. To some, for example, the existence of God and the immortality of the soul appear as certain as their own existence. To others, both affirmations appear highly disputable. About virtue, duty and the good conflicting propositions have been taken by different people as accurate. These divergences are often explained as arising from confusion and mutual misunderstandings. In the case of the good, for example, it is suggested that people are really agreed about ultimate ends, but differ as to means, while misunderstanding on the ultimate question arises from the confusion of means and ends. But the admission of such confusion is fatal to the inherent sufficiency of self-evidence. It may be that there is always a kernel of truth within the husk, but if so, we must be sure that we have stripped off all the husk before we proclaim our certainty. That is to say, our axiom must be subject to criticism, and criticism means comparison and interconnection with other judgments, other data of experience or products of thought. We can no longer take the self-evident as an isolated datum. We have to treat it as part of a comprehensive system of thought wherein it may undergo correction.

The difficulty that appears in this view is that we seem to have no fixed starting-point or given basis for the operations of thought. Instead of being furnished with first principles, which we can apply without any shade of doubt, we have to build up our principles as we go along, and it is hard to see how in so doing, we can escape a vicious circle. If, however, we analyse the conception of rationality more closely, we shall see that on the one hand it excludes the notion of an axiom detached from those forms of connection with the totality of experience which constitute proof and explanation, while on the other it enables us to understand how our thought-system takes gradual shape by the mutual determination of its parts rather than by crystallisation around a core of unchanging principle. To understand this result, let us conceive the rational principle at work on a limited scale. Let us suppose that we form a judgment, no matter what or how, so that it be a genuine thought, asserting, let us say, some relation between two terms, and held with a certain degree of assurance or conviction. Now, if we are asked for a reason or ground for this judgment, we naturally look to some further thought or some further experience that can be rendered in thought. We do that alike whether we wish to *prove* the original judgment or to *explain* the relation which it asserts. Proof and explanation, the two aspects of the work of reason in thought, appear to take us outside the content of what is to be proved or explained. But if this process be generalised, it inevitably leads us to something which is neither proved nor explained. This way of conceiving reason, then, leaves its work necessarily incomplete; there must be something unreasoned. It also leaves it dependent, for what is reasoned out follows from what is not reasoned out.

6. This leads us to ask whether there is not another way of regarding the work of reason which is not thus self-mutilated. We shall not, indeed, attempt to get rid of immediacy. The mediate judgment which we hold as proved by others must ultimately rest on an immediate judgment. To this we must agree under pain of lapsing into an endless chain depending from nothing. But it does not follow that the immediate judgment is something isolated and absolute. Many judgments, judgments of perception for instance, which are quite immediate deliverances of our consciousness, are known to be the result of complex processes, and they sometimes corroborate and sometimes conflict with one another. They are immediate in the sense that they force themselves upon us with a certain, perhaps very high degree of conviction, but analysis shows that complicated elements have gone to form the apparently simple deliverances, and comparison sometimes convinces us that some of them, notwithstanding the force with which they present themselves to us, are nevertheless wrong. After this experience we are ready to agree that it is only by corroboration that we can be quite sure that they are right, but how corrobo-

rate except by appeal to some judgment which is immediate and final? The reply is that the immediate is not necessarily final. Indeed the main difficulty in the theory of knowledge has arisen from the identification of immediate judgment with final certainty and undemonstrable truth. Immediate judgments there must be, if others are to be mediated to any sound purpose, but what is an immediate judgment?

We should rather ask first what is immediacy. A judgment is a certain cognitive deliverance of the mind. It is a process having a starting point in some datum or some stimulus, and an end in the assertion of some object with a certain measure of belief. What belongs to the process and its result is the distinctive act of the judgment itself, and this is what is meant by its immediacy. Now every judgment, including quite explicit inferences, have this element of immediacy, for the conclusion adds something to the premisses and it is not dependent on anything other than the premisses. The drawing of the conclusion is just the immediate act of the inferential judgment. But the conclusion is precisely what we call a mediate judgment, and thus there is an element of immediacy in the mediate judgment itself. But in the mediate judgment the datum or starting point consists of judgments and the result is a new judgment formed from old ones and known to be contingent upon them. The judgment starting from or based on something which is not a judgment is then what we mean by the immediate judgment proper. The processes underlying the immediate judgment may be very complex. This is so, as remarked above, in the ordinary perceptual judgment which is usually not founded on any other judgment but is a direct response of the mind, as it has come to be, through, perhaps, a long series of experiences, to stimuli which in themselves may be of great complexity. We have no warrant for maintaining that such processes always work infallibly for truth in the judgment. Indeed if immediacy were infallible there would be no error, since all judgments are made up in the end of immediate elements. How then do we distinguish true and false?

7. The only method available is the relation of one judgment to another. We do not reasonably question an immediate judgment unless it is contradicted by another while we may confirm it by the support of another. In case of conflict between two judgments, both immediate deliverances carrying belief, we are arrested and in suspense unless and until we can bring in some other judgment to bear on the same point. Even here it is not sufficient that the third judgment should merely add its weight to the second and so bear down the first. It is not even certain that this would occur, since the first might be held with so strong a conviction as to withstand the combined pressure of the other two. What reason will require is a system which can be consistently maintained, and such a system, if it is to resolve contradictions, must show us why some judgments and methods of framing judgments must be preferred to others, and can hardly be called complete till it shows how the dissenting judgments arise, or by indicating sources of error, does not so much overbear as dissipate them. We then arrive at a system of judgments which corroborate one another, and this is the goal of rational thought.

When we consider the rational process as purely deductive, we suppose judgment A to be derived entirely from a second judgment B. This involves us in a chain of judgments depending ultimately on something without support, which to do its work must be of absolute intrinsic certainty and incapable of proof. As an alternative to this we are now led to consider the possibility that while B necessitates A it may also be true that A necessitates B. If that is the case we have a consilience of two independent judgments and the result is a miniature system in which the several parts imply one another. In this system there is no part without some rational justification, for if we start with A we find it corroborated by B, and if with B we find it corroborated by A. Of course if we *only* believe A because we believe B and believe B *only* because of A, this would be to argue in a circle. But if we believe each independently on its merits, if each is an immediate judgment or rests on an independent system of immediate judgments, and if they corroborate one another, then the case is altered. Starting from different sides they meet in one point. The fact of their consilience tends to substantiate both at once. Their respective contents throw light on one another. We are no longer proceeding in a linear series, proving one proposition by means of another which is unproven and unexplained. We are moving within a miniature system, each part of which necessitates the other, and no part figures as an absolute ‘ beginning,’ nor does any necessarily point for explanation to something outside the system. If this is so, the system AB is a rational system devoid of that self-mutilation which we found in the deductive ‘ series.’

As long as our conclusions depend wholly on premisses, and these on further premisses, until we come back to first principles, our reasoning forms a chain which hangs from a fixed support. But the support itself is non-rational. No reasoned account of it is or can be given, and no completely rational system can therefore be formed on this method. It is only when each element in a system necessitates and is necessitated by the remainder that the non-rational element disappears. Every judgment affirming some element in such a system has a rational ground, and the same may be said of the thought which conceives or the judgment which affirms the truth of the system as a whole. It is a reasoned judgment—reasoned not because it depends on some outside truth, but because it is inferable from any of its parts. Thus, in our miniature system of two judgments, if we assert A it gives us B, if we assert B it gives us A. In either case the second judgment substantiates the first, and in both we have the whole AB, the result of two independent corroborative judgments. A rational system of thought appears to be generically a whole of this kind.

Such a system can be extended indefinitely, and can only be negated or modified by a judgment drawn from an independent source. Hence, if it included all experience, it would be finally established. If it included all human experience it would be established as fully as human experience at any given time could establish it.

In point of fact, any system at which we can arrive is never so complete as this. Our contact with the real world is partial and sporadic. From a heterogeneous experience we get a multitude of glimpses and partial views, and it is but gradually and slowly that we bind them together. It is, however, this work of binding them together that constitutes the distinctively rational in the human mind. It is irrational to divide up thought in such a way as to take any part in complete isolation from the remainder. It is irrational to take any partial view as final truth without considering the bearings of other views derived from other sources. We may even say that it is irrational to be contented with the results of our partial experience, however perfect its internal coherence, instead of actively seeking fresh data from fresh experience. Conversely, it is the positive work of reason to be for ever organising our experiences into a systematic whole of thought. This is as much as to admit that the work of reason is never done, that it is permanently operative in the way of bringing all manner of experiences into relation with one another, but that the total view of the world which it forms—or even that which it could form if its synthesis were far more nearly perfect than it is—is not, and, for a limited mind cannot be, final. What is definitely established is not the totality of thought achieved at any given time, but the principle of organising experience as a whole. In proportion as this principle is carried further we reach, not the truth, but a step on the way to truth—fuller knowledge, deeper insight, more articulate expression. It is in this sense that thought, as an interconnected system, is valid.

8. Nothing has been said so far of the methods by which judgments are formed, and interconnected. Now we cannot prove or test methods of interconnection without using methods of interconnection, but if we can find means of comparing them we may be able to determine whether any two processes of interconnection are consistent or inconsistent, and, further, whether those that are consistent are also consilient, that is, imply one another. The indirect test is by results. Sound processes

should yield mutually consistent results. We do in fact use this test, abandoning methods which lead to contradiction and holding on to those which give consistent results. Yet the test is doubly faulty. For the conflict might arise from faulty or insecure premisses and the method might really be proving its soundness by exhibiting the consequences of a fault. Conversely, results might happen to coincide, though the method of arriving at them contained a flaw. The indirect test of results plays its part in the end, as will presently appear, but only in conjunction with a more direct test. This consists in analysing the process of inference, that is, in forming the felt necessity of drawing the conclusion from the premisses into an explicit judgment that the relation between them is necessary. Whatever the full meaning of necessity, it includes universality, because it excludes contingency. The relation between two terms cannot be necessary if it exists in some cases where one of the terms is found but not in others. The felt necessity of the particular inference when analysed into a judgment then becomes an assertion that the character of the premisses is such as to require the conclusion universally.[1] They constitute the ground of which it is the consequent. As soon as we can thus formulate a general relation of ground and consequent we have a means of comparing inferences. If any inference violates this general relation there is a conflict in our processes of thought. It is then possible that the analysis which gave us the relation is faulty or that the inferences which engendered it were faulty or, finally, that it is in the rebellious inference that the fault lies. To satisfy ourselves we have to proceed just as we did before with judgments. That is, we have to seek for a system of inferential processes which will be consistent all through and will remove the feeling of necessity in the inconsistent judgment by showing how and where it is fallacious. We have then a body of inferences mutually consistent because expressing a single principle. This principle, however, is not a prior truth from which the inferences are derived but is the analysed expression of the necessity felt in each and all of them. The felt necessity of the inference in any one case implies the truth of the principle, and thereby the corresponding necessity in every other case. The inferences which fall under a common principle then are not merely consistent but consilient. They imply one another, and the principle rests its validity on the felt necessity of the cases in which it operates substantiated by that mutual implication which itself reveals. If, finally, such principles give rise to conflicting results, we have the same problem as before and have once again to seek a wider and fuller necessity. Particular inferences are often faulty, but when by analysis and comparison those which are mutually inconsistent are separated out and those which coincide and so necessitate each other are formed into a general statement or law of thought, we have in such an axiom the expression of the consilience of a body of processes habitually performed by the human mind. These laws have further to be compared with one another, and it has to be seen whether contradictory results arise in applying them to experience. These are tests positive and negative of consilience and mutual consistency parallel to those applied to the judgments which it is the business of the methods to connect. We cannot prove the validity of logical methods by deducing them from something else; we can substantiate them by showing that they are consilient. The principles which embody these methods will be the legitimate principles of reasoning, and the body of thought formed on these principles will be rationally formed and is rightly held valid.

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[1] It is hardly necessary to remark that the universal would ordinarily recognise contingency in the shape of uniform variation under specified conditions, but in this shape the contingent is itself a universal.

The view of rational thought put forward here is confirmed by the actual character of our knowledge, and its points of strength and weakness. In the rough our common-sense knowledge forms a coherent system; that is to say through ninety-nine hundredths of our daily life we find our grounded expectations fulfilled. Our world is orderly, and the senses of sight, touch and hearing supply us with information about outer objects which in the mass corroborate one another. The coherence, however, is not complete. The abnormal plays its part, and there are departments of the environment, like the weather, where mutability reigns. The lack of completeness leaves an element of uncertainty in the domain of common sense, and forces the candid to acquiesce in the judgment that, after all, probability is the rule of life. The endeavour towards a more complete, and also a more express and conscious coherence, takes us into the region of science and of philosophy. Here the true character of coherence tends to be masked by the impulse to find a single first principle from which a department of truth or perhaps (in philosophy) the whole of truth may be deductively inferred. This impulse is in reality due to a one-sided apprehension of the idea of systematic unity. What appear as ' first ' principles are, in fact, based on the harmony of experience which they themselves reveal. They are neither *a priori* truths nor mere assumptions which turn out to be consistent with experience. They express the pervading unity in a system of judgments shown, in the manner indicated above, to necessitate one another, and such a system we now see is precisely what we mean by a rational and valid body of thought.

9. We have now seen in what sense it is possible to meet the demand that a reason shall be given for all that we think. It remains to consider (2) why and in what sense it is irrational to let our thoughts be determined by our desires, emotions, or, in fact, by anything proceeding from our own peculiar mental make-up rather than the intrinsic character and relations of the objects asserted. The most obvious objection to this element in our definition of the irrational is that reason itself—our connected system of judgments—will force us to recognise facts which depend for their bare existence on ' our own peculiar mental make-up.' Any fact of my own consciousness, any feeling or emotion, for instance, comes into being because I am so constituted as to feel it. There may be an ' external ' exciting cause, but the feeling is the reaction of the conscious being upon it, and there are countless individual differences in such reactions. What causes pain to one may be

a source of pleasure to another, but the pain and the pleasure are alike, for the time being, facts. If I make a mistake or suffer from a hallucination, the mistake or the hallucination are none the less facts within my consciousness. The reply is that they are not irrational as facts but only as judgments. What is essential to truth is that they should be recognised for what they are, that is to say, that the assertion made—' I feel pain,' ' I see a ghost,' should be recognised as states of the person making the assertion and dependent on his mental constitution. So recognised, there is nothing false about them. Error comes in when the assertion takes something which depends for its existence on the nature of its own mind for something independent of that constitution. If the error is eliminated by allowance for the contributory cause the assertion becomes true.

A second and more subtle objection is that knowledge of the truth itself depends on our ' mental make-up.' Knowledge is a state of mind, and is arrived at by mental processes, and may even be said to be attained under the influence of feeling or desire—viz. by the impulse to investigate and the interest in truth. There is, in this sense, a ' subjective factor ' in rational thought, which cannot be eliminated without eliminating thought itself. These processes and impulses, however, are *ex hypothesi* not those ' peculiarities of the mental make-up ' which disturb our judgment and cause its assertions to diverge from the real character and relations of the objects asserted, and it is these peculiarities, and these only, which have to be eliminated from the work of rational thought. What is irrational is to maintain any assertion without regard to any peculiarity in the constitution or attitude of the asserting consciousness which might cause divergence from the truth. The implication is that truth is objective, *i.e.* something independent of any opinion that might be formed about it. Except for the facts of the individual consciousness and the changes which the individual has set up in the outer order, the system of truth would remain unaffected by the removal of the individual from the world. Whatever, then, is at work in the mind of the individual to cause divergence of opinion from this standard is included in the conception of the subjective factor in judgment, and it is in this sense that a rational order requires the elimination of the subjective factor.

We may, in fact, take the conception of objective Reality as the central point towards which all our distinctions of Rational and Irrational lead us. The subjective factor is eliminated by a recognition of the incoherences which it introduces into our thought. Conversely we take as objectively real that which stands every criticism which doubt can suggest and offers a consistent answer to them. Contradiction lurks in judgments about reality but not in Reality itself, and those philosophers have been in error who have identified opposition and conflict which do occur in Reality with contradiction. All parts of Reality must at least be mutually compatible as long as they remain parts and all Reality must be self-consistent. But we look for more than negative self-consistency. The goal of all our rational thought about Reality is a complete and thoroughly interconnected system of judgments—interconnected by methods which themselves, as shown above, form a consilient system. But actual thought falls short of this ideal. We constantly find that the harmony arrived at from certain data is disturbed by contradictory results, and that some readjustment becomes necessary, in the process of which we often discover that our original system was insecurely founded. Thus construction constantly involves criticism, correction and reconstruction. The general principle of such reconstruction is simple enough. It is simply that of the impartial application of the idea of consilience. That reconstruction which will overcome contradiction and reintroduce not merely consistency but consilience is rational. But the difficulty that arises is this. If a body of thought which is internally harmonious may yet in contact with fresh data prove to contain error, at what point can we be sure of attaining final truth? Even if the whole of our present experience had been reduced to order, which is far from being the fact, might it not be exposed to the chance of subsequent correction? And if this be admitted, where is our ground of confidence? The answer is that the validity of thought is not that of finality or achievement but of growth. The most general expression of the rational impulse, which sums up all reasoning processes and depends for its validity on the fact that it does so, is the impulse to establish intellectual harmony. This impulse is not defeated by error, because under its control error is always partial truth, leading by its very imperfection to further investigation and correction. An error may, in fact, involve more insight and a larger grasp of experience than a truth that is maintained without insight into reasons, and in the pursuit of the consequences and implications of error we get back to a wider and deeper truth. Thus the ultimate basis of our thought is not one of certainty in assignable net results, but the conviction of the justification of the impulse towards harmony, which conviction is not contradicted but corroborated by the actual course of intellectual history. The organisation of our experience in this view would remain a valid and a rational process even if none of its results were final in the form which they assume at this moment. Rational thought is no longer limited to the apprehension of a fully and finally established system. It becomes rather an impulse working towards an ideal organising the acquired results of experience into a coherent whole, and extending them by persistent investigation.

Thus Reason in general may be briefly defined as the impulse towards interconnection.

10. There is, however, an ambiguity in the use of the term 'rational impulse' which remains to be examined. We speak of 'establishing,' of 'seeking' or of 'coming to appreciate' interconnection. These terms are not really convertible. It is true that commonly we speak of 'establishing' a law, *i.e.* of discovering and proving some general relation to be true. In this we speak as though we were actively creating something. Yet the very point that we establish is that the law holds, and always will hold, whether we believe it or not. We are not then establishing or creating the law. The only thing we are creating is a thought in ourselves and in others which recognises that

law. It is only on this side and in this limited sense that the reason is creative in the sphere of knowledge. In the sphere of action it has a wider scope. For the rational impulse has a practical as well as a theoretic application. On the practical side its object is not merely to interpret or appreciate existing interconnection, but to alter, transpose, abolish, create or modify so as to form a new kind of system, a new order in Nature or human life. To give a generic name to the element which prompts and controls action we may call it feeling, and say, again to use the term in a very wide and generic sense, that feeling prompts to such action as serves its satisfaction or removes causes of dissatisfaction. In the permanent satisfaction of feeling there is a relation, which we may call harmony, between the feeling and its conditions, and we mean here by harmony a definite mutual support between a succession of feelings on the one hand and a set of conditions out of which the feeling arises on the other. The feeling is at the root of efforts to create or maintain these conditions, and the conditions as they are realised give rise to the feeling. We may thus consider satisfied feeling as a state of harmony between the mind and certain conditions (whether external or internal) that affect it, and dissatisfied feeling as a disharmony. Now if we seek for a moment to imagine that there was only one mind in existence, and that it could experience only one type of feeling secured only by the presence of certain conditions, the whole work of reason on the practical side would be that of supplying the knowledge which would be utilised as a means to securing the requisite conditions. So far there would be no particular object in introducing the conception of a practical reason or a rational impulse in practice. When, however, we consider, even within the limits of one mind, the possibility of many types of feeling, which may rest on discrepant and even contradictory conditions, a new question arises, which feeling is to be preferred, and why? We need now a rational ground of preference among satisfactions or feelings, and if we are to apply our former principles we shall look for a connected or systematic order, which satisfies as a whole, in which subordinate or constituent elements of satisfaction find their place in relation to the whole, and in which no discord or contradiction of feeling with feeling is tolerated that cannot ultimately be resolved into a more deep-lying concord. The only difference will be that here the principle of interconnection, the test by which consistency and inconsistency are to be judged, is that of practical reconcilability. Feeling must harmonise with feeling, as each feeling harmonises with its conditions. There must be the relation of practical mutual support throughout the order. The impulse of the Practical Reason will then be to establish a practical harmony, a life of feeling in which the parts are so interrelated as to form a connected whole. Lastly, if we introduce the conception of a multiplicity of persons or relatively independent centres of consciousness, no difference of principle emerges. There is only the further possibility of conflict or harmony as between the feelings of different persons, just as before there was the same possibility as between different feelings of the same person. The rational impulse in its practical application will remain the same. It will be the impulse to constitute an order dominating the world of mind as a whole in all the centres of consciousness in which it lives, an order which as a whole satisfies the mind, in which all constituent elements of satisfaction find their place by their relations to one another and to the whole, in which no discordant element is allowed a place. The practical impulse is impulse guided by feeling, and if there is a rational impulse in practice its work must lie in the direction of establishing a harmony in the medium in which it works, that is to say, in feeling wherever found, and that, again, is as much as to say throughout the sentient creation. The impulse of reason then is towards the establishment of a harmony throughout the world of mind, and this harmony rests on two conditions, (1) on the harmony of feeling as between one mind and another, and as between any one mind at any moment and itself at any other moment, (2) on the harmony between natural conditions and the requirements of feeling whether those natural conditions belong to the physical environment or to the structure and functions of any given mind itself.

To sum up. In cognition the rational impulse is to appreciate a connected system. In practice the rational impulse is to establish a harmonious system. What is rational is the interconnection of elements in a pervading unity. In cognition we have the impulse to discover this interconnection as a permanent reality. In practice we have the impulse to create it in the shape of the unity of that Feeling on which generically all impulse rests. The point of difference being understood, we may speak of the general function of Reason as that of Correlation, or of bringing elements together into a connected whole.

The ethical order then is rational just in the same sense as the cognitive order. That is to say, both have an ideal towards which they work, and that ideal is one of the harmonious interconnection of elements. So far as such interconnection is achieved both can claim to possess objective truth, *i.e.* truth independent of and superior to opinion or (on the practical side) desire, though neither can claim finality in their rendering of the truth. On the practical as on the theoretical side then we take the movement of mind to be a movement towards truth through progressive harmony. But on the one side the aim of rational construction is an appreciation, partial but within its limits just, of the Real Order, on the practical side it is the achievement, as an object of effort, of an ideal which is rationally justified, and founded on the real conditions of the spiritual order.

Such being the rational ideal, we have now to ask how far it is attainable. On the side of cognition we must enquire what methods of interconnection we possess which stand the tests of validity that have been laid down, and how far, on these methods, we actually succeed in organising experience. On the side of purpose we must ask whether the order of reality as thus interpreted according to the best of our lights does or does not present the conditions upon which harmony can be achieved by the effort of mind. The discussion of the first question will occupy the two following chapters. That of the second question will occupy the remainder of the volume.

CHAPTER III

THE PRINCIPLES OF INTERCONNECTION

We have propounded an ideal of rational thought and we have now to enquire whether such an ideal is attainable in knowledge. Beyond a very narrow range we can only connect one judgment about Reality with another by means of what we know of connections in Reality itself, hence the effort of our rational thought is to discover such connections and the goal of rational endeavour in knowledge is to interpret all Reality as a whole of interconnected parts. This goal is unattainable unless Reality does in fact constitute such a system, and it is difficult to believe that the main impulse of rational thinking is founded on falsity. It is tempting, therefore, to infer the goal from the direction taken, but it is a temptation with respect to which we must be upon our guard. Rational principles, if our discussion of them has been correct, require us to carry interconnection as far as we can, but the requirement would not necessarily be frustrated nor the value of the effort destroyed by the discovery of limits beyond which it could not proceed. We may very reasonably regard the conception of Reality as a system of interconnected parts as the hypothesis of rational thought, but we are not justified in regarding it as an axiom which can dispense with verification.

1. *The Inductive Principle.*

Reasoning from the bare ideal of interconnection, this is as far as we could go,[1] but we have still to consider the specific principles of interconnection implied in critical thought. We have to enquire whether they conform to our criteria of validity, how far they actually succeed in organising knowledge, and whether they involve any generalisations about the real order. For if they are valid and if they do involve any such generalisations, those generalisations are reasonably held good. These, then, are the questions to be examined in this and the following chapter.

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[1] For some further discussion and a partial qualification of this conclusion in the light of a fuller review of the work of thought see below, Chap. VIII. pp. 423-430.

We have said that generically it is the function of reason to interconnect and that, in the establishment of knowledge, this means to find out existing interconnections and to use them in the development of further knowledge. Interconnection by cognitive thought in general consists on the one hand in discovering grounds for the existence of anything in a given shape and form, in a given relation, and so on, and in developing consequents arising out of that which we have already established. Now the relation of ground and consequent presents several types. What they have in common is uniformity of relation. The ground is something to which something else called the consequent stands always in uniform relation. The uniformity is unilateral, *i.e.* given the ground we infer the consequent, but we cannot without additional knowledge convert the inference. If G is ground and F consequent, the relation may be conveniently symbolised as $G \rightarrow F$. Now if $G \rightarrow F$ occurs in our experience without exception it is possible that it is not only uniform in our experience but always, that is that G is a true ground of F. In fact our naive experience takes this to be the case and from what ‘ has always been ’ we infer to what is and will be. But criticism soon shows us that cases differ and it is then, if our reason exerts itself, that we enquire into the ground of the difference, for a ground we are sure there must be. If we have $g_1 f_1$ and $g_2 f_2$ but not $g_3 f_3$ there must be something to account for it. It may be that g_3 is not really quite the same in character as g_1 and g_2 or it may be that there is a change in some attending circumstance. If the g's are really indistinguishable it must in fact be the latter. There must be difference of circumstance to account for the difference of relation and it does not matter how often the relation g-f has been experienced. Given that we have f here in the case g_1 but not there in the case g_3 verified as indistinguishable so far as the g is concerned, there must be a difference in some circumstance to account for the difference as regards f. One difference implies another.

Now if a difference in respect of f must have a ground, f itself must have a ground—otherwise we might in the case g_1 have f_1 without a ground and in the case g_2 have $\overline{f}_2$ with no change of circumstances. In assuming that every difference has a ground we are therefore assuming that every fact has a ground. The ground of f_1 might be simply and solely g_1, and in that case we have the relation $G \rightarrow F$ universally. But it may lie in a circumstance c, which is quite disconnected with g, or which includes g and something more, possibly even something most conveniently stateable in negative terms as the absence of certain special circumstances. These cases differ widely but they agree in this, that the relation $G \rightarrow F$ is contingent upon some circumstance. Thus, given an observed relation $g_1 \, f_1$, that relation is either universal or, given one term (as g_1), is contingent upon some circumstance, is in fact the consequent of that circumstance as its ground. It follows that if by any means we can eliminate the possibility of any such external ground we establish an observed relation as universal, and this is in fact the problem of scientific induction.

It will be seen that the whole of this argument is an expansion of the principle that every fact has a ground. It is also an emendation of the innate tendency of all intelligence to use its experience as a basis of anticipation, generalisation, or interconnection. For in this tendency we impute like to like and (with a shade more of criticism) difference to difference, and as we bring likeness and difference into relation we get at the principles stated above. Thus starting from different ends we reach the same result. Furthermore, these principles are involved, not indeed in deduction as such, but in the use of deduction in the analysis of the concrete. When we apply a general law $A \rightarrow B$ to a concrete case, we well know that we must allow for concomitants C, D, etc., the effect of which may be to modify B very materially. This does not disturb the truth of our law but merely sets us upon analysing the complex situation into the elementary laws which it combines. The variations in B are thus explained by reference to varying concomitants. But suppose that such variations could come about on no grounds at all. It is clear that our analysis would be frustrate, and no generalisation however reached could be securely applied to concrete reality. We will not say that deduction as a purely abstract or hypothetical process involves the inductive principle, but we must say that in any application of deductive analysis to concrete experience this principle is implied.

2. The universal applicability of the law of Ground and Consequent or any similar principle such as the law of causation is now doubted by many writers. Some with perfect consequence deny the rationality of generalisation and reduce the strict operation of science proper to the rendering in terms of concepts of all that which has in fact been observed. I doubt whether this corresponds to the real beliefs of scientific any more than of practical men, or would justify the implication of continuous objective process involved in the description of any experiment whatever. But others seem to suggest that scientific generalisation is successful and valid only in sections of Reality where we have happened (by whatever method) to hit upon the true grounds of phenomena, and that this being so no general principles such as we have laid down are requisite. They also think any general principle valueless because the alternative possibilities which it must allow are indefinite and cannot therefore be eliminated. This objection is dealt with in the paragraphs that follow. Here I have to remark that the sectional theory may be based on two hypotheses. The first is that we have some method, other than the use of experience, of assigning grounds. But science has generally come to insist on its claim to rest upon experience because of the difficulty of pointing to any other method of detecting, and more

particularly of establishing, grounds, which is not precarious. And we have seen that no universal proposition can be securely applied to concrete experience if the inductive axiom is unsound. Hence it seems in fact to be meant (and this is the alternative hypothesis) that the observation of uniformity to some considerable extent is a valid basis of generalisation. If that is so, some observed uniformities are taken to be relations of ground and consequent, that is, they are generalised. But if we can thus generalise observed uniformities in one case, why not in another? Any possible answer must turn on the specific character of the experience and of this we can certainly say that if it is not such as to exclude dependence on some external condition, the generalisation is precarious. Thus the main objection to our principle, which is practical rather than theoretical, remains standing. If on the other hand we have succeeded in excluding dependence on external conditions there is on our principle no further experience to which we need look. If our principle is denied we have still to ask what such specific experience can be.

We can generalise from some experiences but not from all. That is common ground and it amounts to saying that we can generalise upon conditions. These conditions, if valid at all, must hold wherever they apply, and if when they are satisfied we can generalise in one case, we can generalise in any other. In other words, generalising is a thought process in which from empirical data satisfying certain conditions as the ground, a universal judgment is reached as the consequent. It is just the same thought process wherever applied, and subject to the same criteria of validity.

Now we laid down above that the test of validity for a thought process lay primarily in an analysis which exhibits it as a case of a universal principle which can be consistently applied. Crude generalisation cannot stand this test. Generalisation governed by the inductive axiom does stand it. We have then arrived at a principle stating the conditions under which the generalisation of an observed relation is valid and distinguishing it from uncritical generalisation of an observed relation, which is invalid. The evidence that such generalisation is valid lies *prima facie* in the fact that this is the way in which our minds proceed when their procedure is purged of contradiction, and secondly in the fact that the use of experience thus purged stands and falls as a whole. If we can apply it in any one case we can apply it in any other where the conditions are realised. These are the primary bases of the inductive principle. Next we saw that this principle implies and is implied by the law of ground and consequent, which is the principle of all rational enquiry, and finally we saw that it was implied in the application of deductive analysis to concrete reality. We thus have several methods of the organisation of experience which imply one another. It remains to compare them with any other principles of thought which we can discover and to test them by the consistency of their results in diverse applications.

The applications of our principle are of special importance because the doubtful point that has already emerged is whether the negative requirement which it contains can in fact be fully met. The principle might be true but inapplicable, and therefore empty. In examining this point we shall see first that our principle leads to certain general results which have so far commended themselves both to ordinary and critical thinking as to figure often as independent axioms, and that these results facilitate its application. Secondly we have to consider the nature of partial grounds of belief, that is probabilities, and the effects of corroboration. Thirdly, we shall have to deal with other principles of generalisation and consider whether there is any relation between them and that which we have propounded. We begin with the derivative generalisations.

3. When we think of the principles of Ground and Consequent in relation to experiential data we have to bear in mind that every object of experience is extended in space and time. Points and instants are abstractions, terms of measurement or comparison between one object

and another. Every actual event passes. That is to say that wherever we take it it has two sides or aspects, a coming and a going. We may divide as fine as we will, but this duality, or (if we consider that it is one object in two relations) triplicity always remains. This triplicity, then, is the basis of continuity in experience, both the continuity of being or persistence and that of becoming or change. For in experience things are continuous in respect of an element which they have in common and thus two events are continuous when the going of the one is also the coming of the other. If the second is of different character in any respect from the first, and yet such that its beginning is indistinguishable from the ending of the first, this is continuity in change or becoming. If it is entirely of the same character as the first the process is one of continued being or persistent identity. Now in any actual process there may be identity in one respect and change in another. If, however, the change is so complete that the new has no element in common with the old there is in that respect discontinuity. Thus in a chess board between contiguous squares there is complete discontinuity in respect of colour, but in respect of surface or the texture of the board there is continuity because the ending of one square is in this respect indistinguishable from the beginning of the other. They are the same part of the board viewed in two relations. When a clock strikes an hour the sound of each stroke is discontinuous. The end of each silent interval is still silent, the beginning of each sound is sound. But the sound fades continuously. If we take any instant within it there is not a constant louder sound before and a constant softer sound after, but a diminishing sound, and at an instant (*i.e.* where no finite time passes) there is no distinction between the end of the previous and beginning of the later phase except that of the relation expressed by 'coming from' and 'passing into.'[1]

Now if we consider a persistent identity A we may take a series of points in it and call sections of the identity at those points A_1, A_2, A_3. We have the relation A_1 A_2 and as A_2 is exactly like A_1 we shall by the inductive principle have the relation A_2 A_3 unless there is a change in any circumstance such as would always be accompanied or followed by a change in the relation (A A). As this argument can be repeated indefinitely it follows that a persistence once started continues indefinitely unless something outside itself occurs to change it, as A being a phase of the persistency does not of itself engender any divergence from A. There are still two possibilities. A may be self-determining, *i.e.* A_1 produces A_2, and A_2 A_3, without dependence on any external conditions. If so the persistence is eternal and A is what we call a substance. Or the continuance may be conditioned and in that case it remains as long as the external conditions themselves persist. But in this case only such changes in those conditions as determine a change in respect of A would avail.

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[1] See footnote at end of the chapter.

Now consider the case in which A is a process with which we are familiar enough to know that if continued for a certain length of time it becomes B. It is in fact the process of transition from A to B and we may call it T(AB) and distinguish its phases as T_1 T_2 etc. Here matters are not quite so simple, for even if there were no outside conditions, T_2 is not quite the same as T_1 and the difference δ might affect the result. It is clear, however, that if it does not, that is, if T_1 produces T_2 without depending on external conditions and if the presence or absence of δ in any form or degree makes no difference, then the transition is self-determining and goes through to the end, as a body moving towards a point of its own momentum reaches that point in the calculated time. Some laws, which we call causal, are of this type. It is also clear, then, that any continuous transition may be universal, and that if the internal changes do not affect its continuance and in any given case the relevant external circumstances are unchanged, the transition will go through and A will become B.[1]

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[1] If the transition at some point brings back its first term, *i.e.* is of the form A B C D A it is cyclical and from the second A we can infer the repetition of the cycle on the same conditions as those which supported or tolerated its first appearance; thus the cycle will be just like the simple,

Suppose next that A and B are discontinuous events, A is the earlier and it is not a phase of a transition to B. It either continues as A or disappears or becomes anything you will, X, but not B, nor T leading to B. Then, though we have A followed at an interval, no matter how short, by B, A is not as such followed by B. Therefore it will not in any case (including that observed) be followed by B unless there is a circumstance C which, whether in conjunction with A or otherwise, is universally followed by B. Again, if any circumstance C is to answer this description, the same argument must apply. If A C is not a process of transition, or if it is a process of transition to X, it will not be followed by B unless again there is yet a further circumstance which determines such transition. Hence the antecedent from which B universally follows in time is either B itself previously existing or a transitional state (whether of something simple or of many elements affecting one another continuously), such as being prolonged becomes B, or becomes a system of which B is a constituent.[1] This continuity in transition is the general

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A-A-A . . . . , permanent unless or until external conditions change, and if there are no such conditions then absolutely permanent. It is probable that much of what we take as enjoying simple permanence, *e.g.* a solid object enduring without appearance of internal change is in reality of the nature of a persistent cyclical recurrence.

[1] This limitation must be carefully borne in mind. Very much of what we find in experience consists of characters or attributes of complexes which appear to be so dependent on the complexes that apart from them they have no existence and none of the continuity of which we are speaking. The complexes do not give rise to those characters as distinct entities, nor do they become or turn into them, but in becoming what they are, have those characters. The relation is one of ground and consequent, not one of cause and effect. It is generally known as that of substance and attribute, but better perhaps as one of inherence or co-inherence. The essential point here is that continuity, whether persistent or becoming, does not apply to all characters of the whole, and our intellectual construction of the world depends very largely on the success in distinguishing between those to which it does and those to which it does not apply. The success which we have on the whole secured in tracing the continuity in the complex of attributes which we call material has given rise to the view that this is the one stable principle possessing true continuity of existence. Conversely, if mental activity is really incapable of resolution into material configuration, there must at lowest be certain elements of mind which are equally continuous.

character of causality.[1] We have reached the result that a persistent identity may be self-determining and unless we have reason to think there is an outside cause, we naturally take it to be so. We require a reason for the denial or even the doubt. The continuous process is in the same case as soon as experience shows us that the changes of phase do not affect the element of continuity. It then becomes a persistent identity in change and we do not ask why it continues but are surprised that it breaks off and are forced to seek an external reason. The discontinuous relation, on the other hand, cannot be universal unless both elements are dependent on the same external ground, and unless we have reason to believe in such ground we do not in general expect such a relation to recur regularly.[2]

4. From these considerations we can understand the general problem of the organisation of experience by

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[1] What is generally called the Law of Causation—that every event has a cause—is a partial expression of the Law of Continuity. Any event E occurs somewhere in Reality, R, and in spatial and temporal continuity with some portion of it, r. If r is not a process of becoming E or becoming something of which E is a part there is discontinuity, and if r is all that is there, discontinuity is not overcome. If r contains no element at all of E the discontinuity takes the most extreme and glaring form and this would seem to be what is really contained in the conception of E arising 'out of nothing.' Nothing, as such, is a concept of uncertain content. It becomes definite only when qualified as the absence of something positive—in this case the absence of any element of E or any element of process becoming E. In denying that E can arise out of nothing we are denying that it can arise out of an r which contains none E the processes which as they continue become E or a system in which of is inherent.

[2] Though on this argument we have to suppose a more ultimate continuity behind discontinuous process it by no means follows that superficial continuities may not hide discontinuities: that they often do so is in fact a matter of common experience. But this only means that to find the real continuity we have to probe still deeper. In the present theory of atomic structure and behaviour we are apparently asked to accept certain surprising discontinuities as ultimate characteristics of the material constitution of the atom and of the relative motions of its parts. If this theory should be substantiated it would, I think, prove fatal not to the doctrine of continuity in process but to the conception of material parts in relative motion as the ultimate explanation of the atom.

thought and in particular the nature of induction, scientific and pre-scientific, its successes and its difficulties and failures. They show that the problem of thought is that of disentangling the relevant from the irrelevant. In experience as it comes to us the two are involved in what at first appears as a hopeless tangle. Continuity yields the first clue. What persists amid change is taken provisionally as self-determined, *i.e.* as substantial, and the process that goes on steadily as self-determining, *i.e.* as causal. The principle thus roughly carried out by common sense may be simply formulated thus. Let an element A be introduced into an environment BC, and be the starting-point of a process A-*a*. This process is not due to BC as such, because it did not arise till A was introduced. But BC may contribute to it. Then let A also be introduced into the environment DE having nothing in common with BC, and let the same result follow. The process A-*a* is then not conditioned by any part of the environment, that is, it is self-determining.

This statement of the method of scientific induction is open to criticism along two lines. One attacks its form or principle, and founds itself on the Plurality of Causes. B or C, it argues, may be the cause or part cause of *a* in the one case, D or E in the other. But the plurality of causes is a doctrine of limited application. BC on the one hand, EF on the other are either permanent, and if so do not yield any element of *a*, or they are phases in a transition, or processes. If either of these processes might be regarded as leading to some one of the conditions of *a*, the same cannot be true of the other, for they are *ex hypothesi* alike in no respect whether as abiding features of the environment or as processes. Nor does the objector fare better if he suggests that not A-*a* but a process or continuant α-α' essential to A-*a* is inherent in the different complexes BC and DE, for this also negates the hypothesis that the two complexes are devoid of a common element.

5. But at this point more substantial difficulties are opened up. How can so much be known about the concomitants? We are always in contact with processes

which escape observation. How can we be sure (1) that in any case, even when we appear to control the whole of the conditions, A is the sole change introduced, (2) that the operation of the concomitants BC or DE does not consist in inner processes having points of agreement which we cannot detect, (3) that there are not quite other unconsidered concomitants that affect *a* ? There are two possible answers. One is an appeal to the theory of chances. It is against all probabilities that, if we go on varying the circumstances of an experiment, we should always light on specially favourable conditions. The other is an appeal to verification. The generalisations which we make on this basis conform to fact, and calculations derived from them, deductions, constructions, yield results which observation confirms. Both arguments lead to the consideration of Probability though in different forms, and their consideration will form the subject of the following chapter.

MEANING OF CONTINUITY

There are three ways of formulating the conception of continuity, two of which depend upon extension, while the third resolves extension into discrete units. Of the two former (1) the first and simplest defines continuity as extension without break. A whole is continuous in respect of a certain character so far as that character extends unchanged, that is, without the intromission of an incompatible character. Thus on a sheet of clean white paper between any two points which are white all the intervening part is also white. If a line is ruled across the paper it becomes discontinuous in respect of colour though still continuous as a surface or in respect of texture of the paper. If the colour is shaded by very gentle gradations till it becomes black, any narrow band will impress us as continuous in colour. But we have to explain the contrast which emerges on a wider view by something discontinuous. Black must somewhere begin to be mingled with the white, the deepening of the shade may then be taken as a continuous process up to the point at which full black is reached when there is again a discontinuity, the change ending and the white finally disappearing.

(2) In the continuous extension, whether of constant or changing characters, there is no boundary between one part and another. Yet we think of or contemplate parts. We thus seem to have parts which are distinct without being marked out from one another. To avoid this contradiction we may put it that in continuous extension whatever boundary we assign to one part is common to that part and the next. This however is not a sufficient criterion, for in a chess board we might

say that the boundary between a white and black square is common to the two, though the squares are in colour discontinuous. The difference is that in the chess board though there is nothing between the black and the white, the beginning of the black is distinct from the end of the white. If both squares were white the beginning of the one would be indistinguishable from the ending of the other except by considering their several relations to what is on each side of them. They are the same element in two relations. We may set out a definite criterion of the difference in this way. If parts of a continuous whole have nothing between them there is always about their ideal boundary a homogeneous element of finite magnitude which is common to the two. If they are discontinuous there is no such magnitude. The definition will apply to things which are also discrete in certain respects. Thus the links of a chain are discrete unities, but each is included in some respect (not in all, since they retain some free mobility) in the cohesive system of its fellow and the chain as a whole is continuous in respect of the links which are in turn sharers in the cohesive system of their neighbours. In the case of the graded colours, each part is at the same time a transition from white or towards black. It is only at the point where the transition begins or ends that this is not true. To sense of a given degree of refinement it may be impossible to fix this point with precision, and so the whole process from the stable white to the stable black is for that sense continuous. But there may always be a heightened discrimination which would narrow down the area of the indistinguishable and at the limit there will be a distinction of character between the end of the white and the beginning of the grey. If thence onwards the transition is truly continuous, any stretch, however small, is not a constant shade of grey succeeded by a deeper, but a deepening shade of grey which is also a diminishing whiteness, and if we draw an ideal line anywhere, any finite strip about it indicates this change and is a scene of shading towards white in one direction, towards black in the other.

(3) The mathematical theory of continuity treats it as composed of discrete terms. For this purpose the terms have to be deprived of magnitude. They become points or instants. They have then to become infinite in number and 'compact,' *i.e.*, between any two points there is an infinite number of points. It results that no point is next to any other. This analysis then does not resolve the continuous into its elements for *e.g.* any part of a spatially extended object is next to another part and if the parts are continuous they have an element in common and there is nothing between them. The object of the analysis is to state the abstract determinations identifiable in a continuous system in virtue of which it can be correlated with or measured accurately against the number series and thereby with any other system, continuous or discrete.

CHAPTER IV

INDUCTION AND PROBABILITY

1. We have seen that a scientific induction, given its premisses, is a valid argument, but the premisses themselves seem as if necessarily infected with a certain doubt. The nature and importance of this doubt we have now to consider.

When we said above that a persistent identity is ‘naturally’ taken as self-determining, the reader's comment may well have been ‘naturally, perhaps, but is "naturally" the same as "reasonably?" All we know is that the identity is there and will continue if dependent on no external condition. But how can we prove that there is no external condition? It is a universal negative involving the whole concrete nature of things. Do not apparently solid things crumble or break, like the cup that "goes to pieces in the housemaid's hand?" Do not the papers of the unpractical philosopher himself vanish unaccountably when no human hand has touched them? How shall we get at this universal negative even in the simplest case? Our principle makes an immensely wide generalisation about the universe, but with all this outlay of assumption we are unable logically to stir a step in the ordering of experience.’ To find an answer we must go back to the underlying principles on which we built up our assumption. We say that belief must have a ground, and this is true equally of disbelief, denial and doubt. We also said that an observed case of a relation is a ground for asserting it generally if there is no ground outside the terms of the relation itself for its existence in the case observed. It would follow that we have reason to affirm the generalisation unless we have reason for asserting such a ground. Now in the case of discontinuous relations there is such a ground in the character of the relation itself as we have seen. In the case of persistent identity or (under conditions stated) of continuous process, there is no such ground. But there are more general grounds. Experience shows a multiplicity of variations affecting these as well as other relations. It shows us that our observations are limited and include only a fraction of that which exists even in our own environment. It proves this by the lack of uniformity which it reveals. Thus to go back to the case in which we deem ourselves to have compared the concomitants of a process exhaustively and found no common element within them, experience suggests that there may after all have been a common element unsuspected by us, and we cannot prove its non-existence. There is a possibility of error, and where there is a possibility of error, there is no certainty.

Now, certainty is an attribute of belief which may be said to have two contraries. One is the certainty of the opposite, *i.e.* of denial as opposed to affirmation. The other is the negative of certainty itself—doubt. Where we contrast certainty with doubt we become aware of intermediate stages of belief varying from a strength which closely approximates to certainty, to one which is no more than a slight preference for one alternative rather than the other. We speak of things that we believe in this fashion as 'probable,' but the term does not strictly apply to the belief itself but to its grounds. In some cases we can measure the grounds, expressing the reasons for a belief as the numerator of a fraction in which the sum of the reasons for and against constitutes the denominator. For present purposes we may suitably generalise the conception, and if we thus measure full certainty as based on positive grounds, with no grounds for disbelief, we get the integer 1 as the measure of the grounds for certainty and for the denial of the same proposition, zero, while the state of pure doubt is represented by $\frac{1}{2}$. Thus the two contraries of a certainty fall into the same scale, though the one is really the contrary of certainty in general and the other of a particular belief held as certain.

Let us now ask what the value of a belief is which is not certain. What is belief in general? It is not merely the entertaining of a proposition. We may entertain a proposition, neither affirming nor denying, nor even doubting or questioning, but merely presenting it to ourselves. Belief has been described as an emotion, and we certainly speak of feeling a belief or doubt. Some of our certainties, if challenged, provoke a highly emotional response. An emotion here as elsewhere is just excessive feeling insufficiently discharged. Gradation of feeling is in fact the subjective or immediate psychological measure of belief. But this element of feeling stands for something more permanent. What we effectively believe enters into the texture of our mind, shapes our ideas, in other relations affects our emotions, guides our actions. It is part of the organised system of our lives, and to destroy it is to engender the necessity of some reorganisation without which there is a break or obstruction in our mental life which in serious matters may be a disaster. In belief, then, the mind is definitely adapted to a certain proposition and the strength of the belief felt subjectively as certainty is measured by the completeness with which the proposition is woven into other propositions and into our modes of feeling and our plans and methods of action. Belief then is the adaptation of the mind to the truth of the proposition, and when belief is full and assured that adaptation is complete and unambiguous. But we are often in the position of having alternative possibilities before us. We may be conscious of our ignorance of essential data or we may have evidence that points in opposite directions. We then adapt our minds to both alternatives at once and we may have to adapt our action similarly, so behaving that either event will suit us. This is the position of reasoned doubt, similar in the absence of felt conviction, but otherwise different, to the doubt of indifference, or the absence of any belief. We also may have grounds for one alternative which though not absolutely decisive are yet felt by us as distinctly stronger than their opposites, and here we have a felt preference which, if the grounds are justly appreciated, is based on a true probability. In this preference we still adapt our minds to both alternatives, but in a different way. We really expect the one but we keep the door open to the other. The nature of the adaptation is best seen in action. The prudent man acts as far as he can in a manner compatible with either alternative. Only where they are exclusive does he decide for the one which he believes to be more probable, and even then he keeps his eye open to the risk and provides himself, if it can be done, with a second string.

It is clear that reason and belief so understood may rise by gradations from the stage in which the alternatives are equal (we are equally prepared to meet either event) to that in which we take one only into account. So far as the belief itself is concerned the difference is subjective and will vary with the temperament of the individuals and the emotional situation. Many people refuse to consider the unpleasant alternative and will not face it till it is absolutely forced upon them—if then. Others are oppressed by the slightest chance of failure and magnify its probability. But as beliefs vary in strength, so also does the evidence supporting them on which (at least as long as its consequences are withheld) people of both subjective tendencies will agree. This variation may be expressed in the series of fractions from 0 (= certainty of denial) to 1 (= certainty of affirmation), $\frac{1}{2}$ expressing the exact balance of evidence *pro et con*.

But the symbolism is only a rough representation of the case. It is not always possible to measure the weight of one argument against that of another in figures. We may be quite sensible that, say, the argument *pro* is much stronger that the argument *con*, although the argument *con* is not entirely negligible. It does not follow that we can give a precise measure of the difference. There is no paradox in this. I may be quite sure that the weight in my right hand is heavier than the weight in my left, but if you ask me how much heavier I may hesitate, and at best my judgment will move within a wide margin of error. In the case of probability there is a sphere in which numerical measurement has a definite meaning. It states the relative frequency of the opportunities for alternative events, and as we shall see presently such relative frequencies do afford a rational ground for expectation, and thus constitute probable arguments of varying strength. The modes of expression accurate in this case have been colloquially generalised, and we say that it is 10 to 1 against such an event, meaning really that we think it very unlikely, but not impossible. If the statement were precise it would mean that in eleven cases in which a certain event or its alternative is possible we should expect the alternative in one. It is important to remark that this is not necessarily the position in which probable arguments leave us. We may be sensible of arguments in favour of a conclusion which are strong without being quite conclusive. The admission that the conclusion may fail does not then imply that in a minority of cases it will fail.

In other words, as long as we take the numerical expression of probability literally, we are in fact alleging some reason for both alternatives. If the chances of A are literally ten to one that means that there is one chance in eleven of non-A—that over a wide area non-A may be expected to occur once in eleven such cases as that in which we stand.[1] This does not express the kind of belief that we entertain when there is no precedent for the failure of A and no deductive reasoning to compensate for the lack of empirical basis. In such case our form of expression may be, ‘ there is every reason for A and none to the contrary,’ and yet this form—though unsuited to any fraction—does not seem equivalent to the integral certainty of an arithmetical conclusion or of immediate perception. The form of expression indicates that there is clear evidence for an affirmation and none for the denial. The alternative seems to be an unmotived possibility. Now, if this is literally the case, doubt is groundless, therefore unreasonable, and there should be no hesitation in making affirmation with complete certainty. But are we sure that there is no such motive at all? There may be no specific evidence on which we could found a doubt, but there is the limitation of human experience, the weakness of human faculty. May it not be reasonable to hold all opinions subject to final reservation on these points? Our analysis of induction suggests the affirmative answer so far as all knowledge founded on experience is concerned, and a student of mathematical philosophy may be pardoned if he extends the same reservation of ultimate scepticism even to that sacred domain, since mathematical reasoning depends on analysis, and a given analysis may not be final.

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[1] For the more precise statement of this expectation and its grounds see below, p. 337 *et seq.*

2. With regard to induction, even if we assume for the moment the final certainty of the axioms which have been used, it is clear that they do not remove this final doubt. On the contrary they justify it, while they also, as I think, may fairly succeed in giving us just that degree of belief which approaches so near to certainty that no finite value can be set upon the alternative. The argument is of this form. The uniformly observed relation A-*a* is rightly held universal unless there is ground for the belief in an external condition on which it depends. The only ground for such a belief lies in observation or in calculations which ultimately take us back to observation, or lastly in the discontinuous character of the relation itself. Suppose we have rebutted the last argument and have dealt with all concomitants which experience of cognate cases suggests as possible conditions. We have then removed all specific grounds for the belief in an external condition. This was what we assumed above when we supposed ourselves to have the sequences ABC *a*BC, and ADE *a*DE, where without A we had no *a*. We met here with the criticism that though neither the process BC nor the process DE produced *a*, each might yield something as *x* which combined with A might yield *a*, or more generally that each might be a process conditioning the process A-*a*. Now this we saw was strictly disprovable, only if we assumed an ideally perfect analysis of ABC and ADE. But even without any such assumption it is a clear case of an unmotived possibility. BC and DE are by hypothesis

known to be radically different, and to infer uniformity of results from difference of antecedents is the direct contrary of our principle.[1] But there is the further consideration that if our analysis may be inadequate our experience is certainly so, for BC and DE cannot be the only concomitants. All that is in contact with A-*a* is concomitant, and some of this may be inaccessible to observation. We may rebut all possible suggestions in turn but we do not exhaust the possibilities of suggestion. All we can say is that the doubt of our result is not motived by any definite possibility that we can suggest.

3. There is, however, a further resource. We can test our first generalisation by others. It is not merely that we find deductions confirmed by observation. That is the inverse method of establishing a hypothesis and is unsatisfactory on logical principles. But we may also have a pair or any number of generalisations implying one another reciprocally, so that not only can we infer P from Q but we could also infer Q from P. In that case we have a convergence of independent probabilities. Now, calculation may take us through very wide fields, as *e.g.* in the physics of the present day where our knowledge of mass movements on the greatest scale is being used in the interpretation of the minutest intra-molecular structures and *vice versa*. The kind of error to which instruments and analyses are liable in two such different fields are not of the same order, and if we find the interpretation arrived at independently in each case to be not merely consistent but so related that the truth of the one necessitates that of the other, then the probability of both is so far strengthened. The case is not that of the vicious circle in which the truth of P depends on Q while Q is in the end found to depend on P. It is that of the valid circle in which P has its own basis and Q its own basis, but they are further so joined that it is impossible to overthrow one without

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[1] For on our principle, from a point of similarity, A, we infer a further similarity *a*, unless there is a point of difference B, from which we may infer the difference *b*. That is, similarity is the only ultimate ground for the suggestion of similarity and difference of difference.

overthrowing both. Organised sciences tend to conform to a body of generalisations interconnected in this fashion —not merely a hypothesis which has run the gauntlet of numerous observed facts without suffering contradiction, but a mass of results each standing on its own basis of observation and calculation, positive evidence which we have no specific ground for doubting, and so connected that the failure of any one would introduce doubt and difficulty in the rest. Such at any rate is the ideal which thought puts before itself in the organisation of experience on the methods which seem in fact to be available. It is clear that on these methods we do not reach finality, which is a true limit always approached but never attained unless by some new turn in the development of mind. It is also clear that we have something more than the kind of loose 'practical certainty' based on the rebuttal of specific evidence to the contrary, for we start with this degree of probability in each component thought of the system and the consilience of our results adds solidity as it advances. The test of consilience measures the value of the bare possibility of a disturbing concomitant. If contradiction arises in our generalisations this possibility becomes a definite probability. If, on the other hand, in any field our generalisations support one another, the bare possibility loses, on test, whatever indefinite credit it possessed. To sustain it we should have to suppose not only an unobserved concomitant affecting p but another one independent but affecting q in just such a way as to make q correspond with p. Any such suggestion of correspondent unknowns is wholly unmotived.

4. We may usefully contrast the rational acceptance of the systematised results of experience with numerical probability on the one hand and with what is called mathematical certainty on the other. In both of these directions, moreover, we come across methods which are essential in this same organisation of experience, and we have to show how they relate themselves to our general principles. First as to numerical probability. If we throw a properly constructed die and it falls flat on one side there

are six possible results. The 'chance' of any one particular throw, *e.g.* 6, is said to be equal to the chance of any other, *e.g.* 5, and it is deduced that the chance of any one is one-sixth of all the chances, while the chance that it may be any one of the other numbers is five-sixths or five to one, and it is in that proportion more probable that I shall throw either 1, 2, 3, 4 or 5 than that I shall throw 6. What precisely does this mean? At the outset chance seems to cheat all reasoning. It is apparently the denial of a ground. The shape of the die and the circumstances of the throw, the laws of gravity, etc., give ample grounds for concluding that one number or another will turn up, but none for any one number as opposed to any other. But unless the die is arrested on its edge (a case which the rules of the game may exclude) it is certain that we must have a number. We seem then to be in the strange position that there must be a number but need not be any particular number, and yet whatever the number is it is a particular number. In fact whatever number falls we have no need to think it falls without a cause. If the die were replaced exactly as before and thrown with exactly the same motion, there is no reason to doubt that the same number would turn up. But any slightest change might alter the result and we cannot calculate what change would be required. It is not then that the ground is absent in nature, but it does not fall within the circle of our data. If it did, the dice would be useless in a game of chance, and all the materials of a fair game of chance are of course specifically constructed so as to exclude the possibilities of fore-knowledge. This notwithstanding, we find ourselves believing and acting on the belief that there are grounds for preferential anticipation (or equal non-preferential anticipation as the case may be) of one event or another; and these grounds are the proportion of the known opportunities for one event or another. The known opportunities of a 6 are as one to five opportunities for some one of the remainder, and the probability of the 6 one-fifth of the probability of some alternative. Moreover, if a long series of throws be made, we expect with a degree of confidence which increases with its length that the number of sixes thrown will approximate to one-sixth of the whole, but we have no certainty that it will ever be exactly one-sixth, and whenever it reaches one-sixth the next throw must in any event disturb the proportion, so that if we continue indefinitely we never remain at one-sixth, though we expect the oscillations about that figure to be less and less.

The position then is that we know accurately the factors which determine a certain set of events. It is enough that we have a die and throw it six times to be sure that we shall have six numbers turning up. Of certain of these factors, viz. the cut of the die, we also know accurately that they give no ground for one of these events rather than any other, and for that reason they do give ground for certain alternatives as against one event (and therefore for any wider set of alternatives against a narrower). On the strength of this knowledge we infer (1) that a particular event has a numerically measurable probability which is as the ratio of its opportunities to all the opportunities, and (2) the larger the number of instances taken in which such a scheme of causation operates the more nearly on the whole (though not precisely nor at every stage) will the actual frequencies of different events approximate to the ratio of the opportunities offered for them by the known factors.

Let us now invert the position. We know nothing of the factors operating, but we actually find two things A and B related in a certain manner in a number of cases. We have, say, 100 instances of AB and 5 of AC (B and C being mutually exclusive). We tend in consequence (1) to generalise this frequency, and (2) if the generalisation fails in passing to some new area of observation (*e.g.* if we now found that in 100 cases of A there are only 60 of B and 40 of C) to infer that some change has taken place affecting this area in general as compared with the other. Finally (3) though A is clearly not the ground of either B or C, yet we suppose that the frequency of their connection has a ground.[1] Frequency is a fact like any other and requires an explanation like any other. If A is accompanied by B 20 times as often as by C there must be a reason for this, and if it is so in one area and not so in another there must be reasons peculiar to the respective areas for the difference.

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[1] A friendly critic asks here and in other cases where I speak of what 'we' expect or infer, what it is that I mean by 'we.' If it is the plain man it may be doubted whether he makes the inferences and in

For the greater frequency of the combination AB as compared with AC there are two possible reasons. One is simply that B itself is more frequent than C. The other is that though A is not the cause of B there is yet a causal connection between them. Such causal connection may take various forms, of which it will suffice to specify two. First, A and B may have a common cause. That is, of the various combinations which *inter alia* determine A, one, G, may determine B, while there is no such connection between A and C. Wherever we have G then we shall also have AB, and there is nothing in this to prevent our having AB in other cases as well. If in a given area G frequently occurs the frequency of AB will also be high, while in other areas the frequency of AB as compared with AC might be simply proportional to the frequency of B

particular observes the cautions specified. If it is the mathematician, he may be in fact quite indifferent to the actual relative frequencies of alternative occurrences. What he is concerned with is the calculation of the known opportunities for one or the other. How far the unknown forces will, so to say, use these opportunities equally, that is, how far the actual grouping of events will correspond with the calculated opportunities, he does not pretend to know, and he may and in some cases does reject the 'inverted' argument from observed frequency to degree of causal connection. Thus (the criticism proceeds) my expression is neither true of what men always expect nor of what the instructed man in all cases holds it reasonable to expect.

My reply is that the inferences specified are regarded as implicit in the methods with which ordinary common sense deals with these matters when these are purged of crudities and hence of mutual contradiction or incompatibility with experience. I think that similar principles are involved in the application of statistical methods in the interpretation (as opposed to the bare description) of any field of phenomena. I know that these methods imply some proposition which is not involved in the mathematical computation of chances, but my contention will be that that proposition is simply the statement that frequency of conjunction is a fact having a ground like other facts, and that as a result the distribution of things and events is a field in which general relations are discoverable as elsewhere. I do not consider this to be properly speaking an assumption, but rather a deduction from the principle of ground and consequent.

and C themselves. We might even have AB strictly uniform over a considerable area and non-existent in another. Conversely, when we find such contrasts we infer some such connection as at least probable. Secondly, A might itself contain some of the conditions of B but not all. The frequency of the combination will then depend on that of the residual conditions, R. Now R being only one of a combination of conditions which produce B, will be more frequent than B itself. It might be extremely frequent. It might be the normal state of things on the surface of the earth. In that case AB might in a wide experience be universal, but it would not be a true and complete causal connection and might disappear altogether under different conditions. One or other of these causes, which we may designate together as consisting in relative closeness of connection, will explain differences of relative frequency in different environments.

5. But now, if we assume the absence of any causal connection, or if we assume that as between A and B on the one hand and A and C on the other there is no such difference in causal connection as will account for a difference of frequency, can we infer that the frequency of AB and AC will be equal ? ' In the long run ' that is what we do infer. If the penny is quite fairly weighted and is tossed over and over again in all sorts of ways we do expect that the numbers of heads and tails will be very nearly equal, and we expect this so firmly that if in experiment it turns out otherwise, even if the difference be small, we infer some lack of symmetry. If in a thousand tosses we find a 10 per cent. advantage for heads we should no longer regard the chances as quite even. We should infer that the penny was slightly weighted on the side of the tail, or more generally we should infer some condition favouring heads. But what is ' nearly ' equal, and what is ' the long run ' ? In ten throws we might well have six heads and four tails without suspecting anything, but if in a thousand we had only 550 heads against 450 tails we should infer not as a certain but as an extremely probable conclusion that there was an unknown factor contributing

to the result. We do not in fact expect equality in a short run. We do not even expect exact equality in the long run, but we expect an approximation which will in general become closer as the long run becomes still longer. What is the meaning of this?

If there were to be exact equality between heads and tails in any series of trials we should come to this, that heads and tails must alternate regularly, only the uneven numbers would then present inequality and that for arithmetical reasons. But such regular alternation would mean that the result of each throw was determined by the preceding one, which would contradict the implied assumption in the use of the penny that there is no determination of one throw by another. In more general terms, if B and C are of equal frequency and A is not in any way so connected with either of them as indirectly to determine its position, then we cannot make the existence of the combination AB a ground for the appearance in the next case of C, for the next case of A is determined by the ground of A, and whatever that be it is *ex hypothesi* not a ground of C. We must look elsewhere and consider a whole series of combinations of AB or AC as a complex combination of which AB or AC is a unit. Now if the unit combinations AB and AC are equally frequent, any combination of them in turn will have a frequency determined, if no other conditions interpose, by the number of ways in which it may be constituted by them. Let us call such combination of combinations a sequence. Thus a sequence of four ABs can only be constituted in one way, by B accompanying A in each case. A sequence of three ABs and one AC may be constituted in four ways which, the presence of A being assumed in each case, may be written BBBC, BBCB, BCBB, CBBB. A sequence of three ACs and one AB also in four ways, and a sequence of two ABs and two ACs in six ways (BBCC, BCBC, BCCB, CBCB, CBBC, CCBB).

Hence, if the elementary combinations are equally frequent and there is in them no reason why they should be associated in any particular way, combinations of such combinations or, as we have called them, sequences, will be determined in their frequency by the number of ways in which they can be constituted by the elementary combinations. This is calculable in general terms, and the calculation shows that sequences are infrequent in proportion as they diverge from the mean in which the relative frequency of their constituents is preserved. We cannot say of any sequence that it will never occur. We can say that it will be rare, in proportion to its deviation from the norm fixed by the relative frequency of its constituents. Thus if in a given field the number of elements B and C that may enter alternatively into a certain combination with A is equal and there is no closer causal connection as defined above between A and B than between A and C, or *vice versa*, and if the fact that A has occurred is no reason why it should immediately recur, there is still a definite reason why some sequences of the combinations AB and AC should be more frequent than others. There is in fact a general ground for calculating the frequency of any sequence which we may choose. If, conversely, the facts do not accord with the calculation there must be some cause of the discrepancy which must involve the reversal of one or more of the conditions specified.

Let us apply these considerations to the case of the penny (A), with head or tail uppermost (B or C). All that we know of the conditions of the fall indicates indifference as between one or other event. Residual conditions are the slight and incalculable variations in the force and direction of the pitch, etc., acting in the whole series of events and only varying in detail from case to case. Everything that we know about these forces (fraud barred) indicates the absence of any correlation of a general kind between any of these conditions and either B or C. Suppose we are right in accepting these indications, that is in denying any such correlation. Still we cannot say generally that in any actual series of tosses the number of heads and tails will be exactly equal, for it is part of the disconnected character of the conditions that they should be irregularly distributed in time and space. What we can say is that sequences diverging from equality in their composition will be rare in proportion to the divergence, and the proportion is one which can be calculated and grows very rapidly with increasing numbers. There is only one way in which a series of ten heads can be constituted, but a very large number of ways in which series with various admixtures of heads and tails may be constituted.[1]

6. Conversely, if, knowing nothing about the relations between A, B and C, we find in observation 100 cases of AB and none of AC, we can say that such a combination would be rare unless either there were some causal connection between A and B or some special cause determining the combination in the series examined. If the series were extended with the same result this conclusion would be strengthened. The interest now shifts to the question of the special cause. If the area is restricted in space and time or to some special condition, *e.g.* of temperature, there is every possibility that the uniformity might fail outside that area. But if the area is enlarged or varied, the special cause for its existence must be something widespread or there must be several such causes, and if all along we do not get B without A it is equivalent to saying that there is an indirect causal relation between A and B. The argument from numbers, extended by variations of area, passes into a form of the Joint Method of Agreement and Difference with the important exception that we are not able to isolate A and so disentangle its effects from the conditions indirectly connected with it. But lastly, when we are so able to isolate A and introduce it into the different surroundings BC and BE, and find that the effect *a* is constant, we saw that there was the possibility to reckon with that our observation is imperfect, that there might be some unobserved change other than A, or some unobserved concomitant other than BC

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[1] It must not be forgotten that even in a large series a close equality, though more probable than any other single ratio, is not so probable as one or other of several alternative ratios, because the number of alternative constituents of several ratios together is in excess of the number which yields any one of them, even that which has the largest number of constituents to be found in any single ratio.

or DE, or some unanalysed resemblance in BC and DE partly responsible for *a*. The number and variety of instances reduce this doubt. Unless the concomitant were either very closely connected with A or else something very general in nature it would be a rare combination of circumstances which would in every repetition of our experiment cause us to light unsuspectingly on the case in which it should happen to be at work. If we do not thus establish A-*a* as a strict universal we may establish it as part of a complex operating uniformly over a wide area, which of course may be further extended by varying the field of observation. To get the true threads of universal connection out of such complexes is then the task of mutual comparison and analysis.

7. What is known to be rare nevertheless occurs, and it is therefore possible that it might occur in a given case. Nor can we call this an unmotived possibility. The chance may be one in a million, but it is still a chance. We rightly regard the opposite alternative as the more probable, *i.e.* we adjust our minds and our action thereto, and if the opposite chance is very small we are wrong to let it in any way hinder us in our preparations for the more likely event. Still we may practise the art of keeping a loophole in our minds for the unlikely, and we may do this in science the more easily as it does not disturb us in making our calculations upon the event which we really expect, whereas in action any backwash of anxiety is a handicap. So far then in theory as we rest on numerical probability there is always a measurably grounded doubt, and though the measure may be small it is finite. It is otherwise when all we know of an alternative is that if it exists at all it must be exceedingly rare. In that case to assume not only that it exists but that it exists in a specified instance which is just one of the indefinitely great number in which it might be if indeed it should exist at all, seems, if one may so put it, a doubly unmotived possibility. That a whole system of accordant inductions such as underlie any established branch of knowledge might be wrecked by mere coincidences is not a theoretical impossibility, but it is a

groundless suggestion. On the other hand, that general conceptions based on experience may be infected by 'unobserved concomitants' intrinsically connected with our position and capacity as observers is no idle suggestion, but has to be taken into serious account in the final interpretation of science. Our theory of induction and in particular of probability then justifies and explains the conditional validity of science. Its results are sound on conditions, the exact nature and bearing of which are still in process of determination by the extension of its own methods and by what we call philosophic criticism.

We have now reviewed the methods employed by critical thought in educing general truths from experience. At their centre stands the principle that everything existent has a ground, which we saw to be the postulate of all rational enquiry and to imply and be implied by any self-consistent usage of experience in inference and by any application of general ideas to concrete reality. From this principle we saw that through the idea of continuity the structural concepts of causality and substantiality are derived, and along with them the methods of critical induction. We saw that on our principles there are possibilities of error in the inductive procedure, and this led us to consider the notions of certainty and probability. Here we found that by the inter-relation of independent generalisations probability might be raised indefinitely near to the limit of certainty, and that argument from the relative frequency of occurrences to the probability of interconnection was properly founded on the law of ground and consequent. This law, then, is the central principle of inductive method, and the result of its critical application is a body of knowledge valid conditionally on allowance for the general factors affecting the human standpoint, factors which are not unalterable or unknowable, but amenable to critical treatment.

So far, then, the methods of induction. We have now to consider other forms of critical thought, to see whether they involve any further principles, and if so how these relate themselves to the principles of inductive method.

CHAPTER V

ANALYTIC CONSTRUCTION

1. The system of universals which is the ideal of thought involves the two processes of the establishment of each universal and their interconnection when established. In fact, as we have seen, these processes cannot be entirely separated. Distinct universals emerge out of the complex of particulars *pari passu* and they advance in definiteness and probability by mutual action. Hitherto, however, we have only considered such action with a view to its bearing on the truth of the universal. We must now consider the process itself, at least so far as is necessary to decide whether any fresh assumptions are involved. *Prima facie* we have this great contrast between the establishment of universals and their systematic interconnection, that in the former case we move in a region of probability and some indefiniteness from which we can never wholly emancipate ourselves, while in the latter we move in a region of definiteness and rigidity which gives us certainty or nothing. The certainty is doubtless contingent upon the strict validity and unambiguous character of the universals employed, but given those conditions it always, rightly or wrongly, claims to be absolute. We have to consider this claim and see whether it can be justified or explained on the principles of validity hitherto laid down.

In general we are now concerned with the application of concepts. Not that this represents the process of which thought is necessarily aware. The operation of thought on a percept or a concept is not itself a percept or a concept until we begin to think about it as such and make a concept of it by a process of analysis. Such analysis, however, if correctly performed, shows us what is implied in the thought process and must be valid if the process itself is valid, and it is validity with which we are here concerned. In this sense, then, we may say that thought consists essentially in the educing and applying of concepts. We can apply one concept to another or to a percept when we discern some point of identity, some element common to the two, and the result of the application is a new whole constituted by the two together, but not contained in either separately. This whole presents features or relations which again are not necessarily the whole nor either of its original constituents, but something distinctive. The detection of these features involves a certain analysis of the whole, and so any application of a concept involves at once synthesis and analysis. The deliberate object of the application may indeed be analysis, as when we render the several elements of an object distinct by finding the series of concepts to which each of its elements conforms. Equally the purpose of the operation may rather be synthesis, as when we analyse a datum in order through some element to bring it under some familiar concept and thus obtain a new conception of its nature as a whole. The result of the application may be that the new concept figures as a case of a generic concept already familiar. This is the process of Subsumption of which the type process is the syllogism in Barbara. In this process, when we look back upon it, it is not always easy to see that we have made any advance at all. If all A is B, and this is A, the conclusion this A is B seems to be part of the major premiss, and the most that is gained seems to be the leaving out of the general reference. But this is not the full analysis. The true conclusion is simply 'this is B,' which is not stated in either premiss alone but is a part of the information supplied by both combined. The new whole is the individual already known in certain ways (A) but now clothed with a new attribute upon the strength of a relation asserted independently of any knowledge of this case between the characters which it presents (A) and the character in question (B). The new attribute may indeed react on what we already know, serving to put it in a fresh light. When we learn that a whale is a mammal we no longer see it as a fish, and we also extend and modify our conception of a mammal. When we learn of a man that he has done something remarkable, for good or for evil, we place him in a new class and we see his other characteristics and actions in a new light. Our percepts and concepts are alike subject to constant revision of this sort, and the subsumption which at first sight seems merely to bring the species under the genus or the individual under the species does not as a rule leave either member of the relation wholly unaffected, and even when it does so the old unchanged attributes plus the new one form a different whole from the old ones by themselves or uncombined.

The principle of subsumption is already implied in the formation of the universal judgment. The universal exists to be applied. It is really, as we saw above, incomplete in itself. We might almost (though I think not quite accurately) describe it as a rule for the formation of particular judgments. At any rate it means nothing if it is not applicable, and applicability involves the formation of wholes by construction and analysis. We may regard some such axiom as 'what is true of A as such is true of any case of A' as the principle of syllogism, bearing in mind that here, as in all cases of genuine and ultimate axioms, the axiom is derived from the thought-process, not the process from the axiom. The axiom defines the process so far as it is consistent with itself, sets out the general terms which it implies and so forms a generalisation, linking all instances of such a thought-process together. But while the applicability of universals is implied in the definition of the universal itself, their actual application involves a still wider principle, operating in every judgment which combines given elements into a whole. We may however consider it first in relation to subsumption. In subsumptive argument the conclusion is valid if and only if it rests on a whole constituted of the exact elements supplied by the premisses and nothing else, and by a correct analysis states an element of that whole and no other. In drawing the conclusion, then, we must be said to assume that we can combine elements into a whole and re-analyse them without error. This assumption, so far as it relates to our actual proceedings, is in fact just as true as our rational faculties make it. Often enough we construct or analyse amiss, or there would be no logical fallacies, and the only ultimate test that we can bring is comparison with other processes in which and in the comparison itself there is of course the same theoretical liability to failure. The ' sequitur ' of the conclusion on the premisses is self-evident, but even self-evidence, since it involves the relation of an object to our fallible apprehension, is not final but must always accept the test of comparison with other things equally self-evident. We are faced here with that radical doubt of all our faculties which is ultimately to be recognised, whatever value, great or small, we may attach to it. What is important in any case is to observe where error may creep in, and in this case the door is through insufficiency of analysis. We take a whole to be composed definitely of certain elements and to present a certain character. If any other element enters into the composition of the whole, if the character is not strictly a character of that whole but involves something further, there is error. What we want to be sure of is that analysis does what it proposes to do—render wholes with exactitude and precision.

2. We reach here the principle of analytic construction in general. Particular analyses may be false, but if any subsumption is to be true, the principle of analytical construction must be sound. What is this principle ?

In the process of syllogising, the elements given in the premisses combine into a whole in which a certain feature, a relation of two elements, is distinguished. Such a relation is hardly, in strictness, a character of the whole, but is a fact within the whole. It is not in any of the original elements by itself, but is in some of them as combined in that whole. Any relation or any sub-group of elements not the whole but emerging, *i.e.* distinguishable in the combination which forms the whole, may be called a character within the whole, or a subordinate character. In syllogism, then, we find elements in relation constituting wholes which we can identify and whose subordinate characters we can distinguish, and the assumption of syllogism is that from the consideration of related elements we may proceed to the assertion of the wholes which they form and the subordinate characters which we distinguish therein, and we can do this without taking anything but the related elements themselves into consideration. If this is justified it must be because related elements are the sufficient ground of the whole or of any subordinate character (as defined) of the whole which they constitute. If this were not true universal subsumption as such would be invalid. If for whatever reason we err in taking the whole as constituted of certain elements or a character as being a subordinate character in the sense defined, the particular syllogism is invalid. The general implication of subsumption then is that elements are a ground of the wholes which they together form and of any subordinate character of such wholes.

This account holds not only of syllogism but of all subsumption. It holds of recognition, for instance, where of the data supplied by memory and present perception we form the judgment which gives an object its name and place. It holds of any element of judgment that goes beyond that which is immediately given at the moment when it is given. The normal function of judgment is in fact to bring given elements together and distinguish subordinate characters within the whole so formed. The elements themselves are the ground of the judgment, and unless they constituted a sufficient ground, judgment in general would be invalid. It is then the implication of the judgment function that related elements as such determine the wholes which they form and the subordinate characters of such wholes. They are the ground of which the whole with its subordinate characters (as defined) are the consequents. This is the axiom of the judgment function which sets out in general terms the principle on which the formation of such judgments as constitute a consistent interconnected system are made, and this is our test of the validity of principles.

3. We are now in a position to consider constructions which are not subsumptions and forms of constructive reasoning which are not syllogistic. When we argue, ‘A is taller than B (or above B or to the right of B or before B or greater than B or brighter or louder than B) and B than C, therefore A is taller (or above, etc.) than C,’ our argument looks rather like a syllogism, but it is not, as it stands, a subsumption. We can indeed invent a major premiss, but only by putting the whole of the construction which we actually make into the premisses. Any axiom that we may form in such case (and use as a major if we will) is pretty clearly of the nature of a generalisation. We can class all such relations as those instanced above as ‘transitive,’ and distinguish those which are symmetrical like equality, from those which are asymmetrical like ‘greater than,’ but I do not know how we are to determine which relations are transitive and which are symmetrical except by considering type instances and experimenting in mental construction or analysis. What I find is that if I take one of the above relations and think of A as greater than B and B than C, I form mentally an ordered whole in which B is ‘between A and C and the relation of A to B repeats itself between B and C and, in an enhanced form, between A and C.’ If this construction is fairly performed according to the conditions laid down above for analysis; if, that is, $A > B$ and $B > C$ are just the elements forming the whole, $A > B > C$, and if $A > C$ is just a feature of this whole (nothing else being at any point surreptitiously introduced and nothing unknowingly omitted), then the result is just and (here is really the assumption) it can be generalised. Any pair of relations of the same type will give the same result and so, too, will relations of other specific types, provided that they can be ordered in similar fashion. The conception of a transitive relation, then, and any law embodying its characteristics, seems to be a generalisation from the results which we find in our mental experiments

when we construct and analyse. The process is liable to error. We may take intransitive relations for transitive ones, with deliciously absurd results. We may omit relevant points or include irrelevant ones, much as we do in generalising from perceptual data. The general principle serves to interconnect and substantiate by mutual consistency all the accurately made constructions and analyses and distinguish them from the false ones. In this way, once achieved, it can be used without a vicious circle as a major premiss (which distinguishes it from the axiom of subsumption), but it is a major which arises out of the work of thought and does not historically or logically precede it.

4. Two questions are involved in this account. The first is how we are sure in any given case that our analysis is correct. The second, how we know that a correct analysis may be safely generalised. As to the first point, let us take a very simple algebraical operation and suppose that we arrived at it 'inductively' from arithmetic.[1] Multiply two numbers $(9+6)$ and $(9-6)$. We have, by the rules of multiplication and of the use of signs,

$$\begin{array}{l} \;\;9^2 + 6 \times 9 \\ -9 \;\; \times 6 - 6^2 \\ = 9^2 - 6^2 \end{array}$$

'Now this analysis of the way in which the result comes about shows clearly that it is quite independent of the fact that we selected the numbers 9 and 6 for our experiment.' In fact this is easily verified by taking any other pair, as 5 and 4, in their stead. 'We can, that is, describe the process in words without using the names of any particular numbers.' Thus, for the particular numbers, we can substitute a and b, meaning by them any numbers, and generalise our result in the form $(a+b) \times (a-b) = a^2 - b^2$.

It is only to be remembered that as long as we proceed in this fashion we must be sure that we do not in our generalised statement leave out any qualification present in the particular example which we chose that was, unknown to us, relevant to the result. Thus in our example we dealt with finite integral numbers. Would the result have certainly been the same if we had taken fractional numbers or irrationals, or infinite numbers, or even if our operation involved the multiplication of negatives? In many instances we have in fact to consider these cases separately. The 'qualification' is just like the concomitant in an induction from perceptual data, and like that concomitant, may be unobserved, and it seems quite possible that generalisation by analysis, perfectly stringent if the analysis is good, might trick us if the analysis should be imperfect. How do we proceed in order to secure ourselves against this possibility? In any mathematical reasoning if the property of the figure or the solution of an equation is not directly given by subsumption under a known general formula, we manipulate the data; we make a geometrical construction; we rearrange the terms of the equation, transferring a term from one side to the other, multiplying through by a term, completing the square, and so on. Each step is guaranteed by an accepted general rule, and it is the synthesis of these general rules in their successive applications to our case at each new stage of our construction which gives us our result. Thus in the case taken, operating from our particular numbers and substituting a and b as meaning any numbers that can be multiplied, added and subtracted, we have by a known definition $a \times a = a^2$, by the commutative law we have $ab = ba$, whence by the rules of subtraction $ab - ba = 0$, and finally, by the rules for the use of signs we have $-b \times b = -b^2$. Thus we 'prove' our analysis by submission of each of its points to more elementary rules.

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[1] I take the example from Professor T. P. Nunn's lucid account in *The Teaching of Algebra*, p. 12.

5. Analytical construction, then, involves certain elementary rules as its guarantee. How are these secured? The theory that they are intuitively certain, needing only to be apprehended in order that their truth might be manifest and requiring no sort of verification, has been wrecked by the progress of mathematics, which has shown

that consistent geometrical systems can be established on the denial of certain axioms held from Euclid's time[1] to be necessary presuppositions of geometrical knowledge and to require no proof. The opposed empirical view founders on the inadequacy of perception to the ideal data which we require for theory. No perception can tell us that two parallel lines do not meet at infinity, while if we were to find two things apparently equal to the same thing but just distinguishable in size from one another, we should infer at once that they stood at the threshold of barely distinguishable difference, *i.e.* we should correct perception by the axiom, not the axiom by the perception. Those mathematical philosophers who, rejecting intuition, seek to derive the body of mathematical truth from logical axioms, appear to suggest that such axioms are not *a priori* necessary or self-sufficient truths, but appear probable in themselves and can be carried without contradiction through a great mass of applications. This is in effect to place them in the position of ordinary empirical hypotheses which hardly does justice to their exactitude and certainty. I suggest that the key both to the confidence which mathematicians have placed in them and to the limits or conditions which have been found to attach to their universal validity, lies in the nature of the analysis itself. In analytic construction we combine elements and obtain a whole, and conversely make a distinction within a whole and obtain constituent elements. If the whole really consists of those elements, no more and no less, *i.e.* with no surreptitious additions or withdrawal of a qualification, the result is sound and can be generalised if we so frame our generalisation that no condition affecting the combination is omitted. Precisely similar elements combined on precisely similar methods constitute precisely similar wholes. This looks like tautology, but it will be seen not to be so when we remember that a whole may have a character as a whole which is not given till the combination is actually formed. The converse proposition would seem to be that similarly constituted wholes have similar elements. But this would be a tautology if it meant that the elements given as composing a whole exist within the whole; while if it means that two wholes, composed of exactly similar elements on exactly similar methods, might be decomposed into other sets of elements which would be found to correspond exactly to one another, it is not secure. We have, however, seen that in combining elements into a whole, new features arise which are not the whole but subordinate characters of the whole, though they do not exist in the elements as uncombined. We used the name to include any of the relations of elements which come about in the combination or any group of the elements which is part but not all of the entire group. The principle required then is that similarly constituted wholes have similar subordinate characters. The two principles combined lay down that precisely similar elements combined on precisely similar methods, form wholes of precisely similar subordinate characters. This is simply the expansion of the principle of the judgment function into a generalisation, for the judgment we saw postulates that elements are the sufficient ground of the wholes which they combine to form and of the subordinate characters of those wholes, and since the relation of ground and consequent is universal, any such relation being given can be generalised. This, then, is the principle at the basis of our analytical and constructive thinking.

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[1] Though not without some criticism.

Thus, on the terms stated, we may erect any analytical construction which we make or find by perception or mental experiment into a general law, only in so doing we have to define our elements and methods of combination in general terms, and we must be sure that our definition includes all that is in the elements that go into the whole, no more and no less. Thus, we might make constructions with finite magnitude which are perfectly sound, but in describing them in general terms we might easily be led so to state them as if they must be true of all magnitudes, and this might be false. For example, that the whole is greater than its parts appears in any analysis of finite magnitude that we like to choose; but with regard to transfinite magnitudes it is doubted or denied (rightly or wrongly) by some mathematical philosophers. That two straight lines which cut one another at a point diverge and continue to diverge is a generalised statement of the results of very simple construction, yet it involves conditions which are not necessarily apparent in such construction. For instance, if we draw our straight lines on a smooth sheet which, as tested by the spirit level, is a plane surface, they would, if produced, meet on the other side of the globe. Our generalisation would have to guard against this condition by requiring that the lines should be 'really' straight, lying in a 'real' plane. But this would involve us in difficulties as to the meaning of the really straight. It is suggested that space might be such that the straightest lines that could be drawn in it—lines that would satisfy Euclid's postulate that the straight line is the shortest between any two points—would yet cut each other twice. If that is so, there is a condition affecting the elements of our construction which might not become apparent over a wide field of observation or calculation, but would nevertheless defeat the generalisation in the end. I cannot here attempt to deal with the validity of such conceptions, but point out only that they illustrate the ultimate identity of the analytical generalisations which lie at the basis of geometry with those of physical science. In both cases we have to take account of accompanying conditions before our result is secure, and in both the final difficulty is that there may be conditions which escape our notice or are even inaccessible to our powers of observation, limiting the extent of the secure applicability of our inference. In both fields, as a consequence, our generalisations hold subject to the correction of a wider or better analysed experience and are confirmed in so far as such experience from many sides and varying points of view not only conforms to them but positively requires them.

6. To sum up the results of the last three chapters. We have traced the validity of thought to the systematic interconnection of given elements in experience. This implies that there are methods of interconnection, and these methods, to be valid, must stand as themselves forming an interconnected system. This system is arrived

at by analysing their character, so that it can be stated in terms of universal relations which all mutually consistent usages of these methods imply. The principles so reached comprise on the one hand (1) the principle that every datum of experience has a ground, which interconnects the principles that underlie the usage of experience in general to found inferences, the conception of causality as universally applicable in processes of change, and of substantiality in the entire system of reality as that which has no ground outside itself to be dependent on. On the other hand (2) as the basis of judgment we have the principle that in analytical construction the elements are the grounds of the results, with the consequence, by our first principle, that the relation can be generalised. Thus our principles are found in the operation of thought in experience through criticism. They form a coherent system of interconnected thoughts and thus conform to our criteria of validity, and the assertions about the real order which they involve, as, *e.g.* the law of ground and consequent, are reasonably taken as true. At the same time our methods, being the result of criticism, must be held liable, like the results which they themselves yield, to further and fuller criticism. Our entire system in principle as in detail is in process of growth, and it is not the results crystallised out at any given stage that are essential, but the nature and process of the growth itself. That our methods subserve growth, and often growth through critical amending and restriction, is not indeed sufficient proof of their final validity, but is an important test which they successfully pass.

Thus the idea of development lies at the very basis of validity itself. When critically examined the certainty which our ratiocination claims is found to hold good only with this saving clause, that it is understood to yield truth not final and complete but partial and in growth. By consistently using our reason we attain not necessarily the truth, but a truer view. The wider the basis and the more complete the articulation of thought, the more just is its rendering of reality—that is the final implication of the rational process. This, of course, is not to deny finality to all truth whatever. There are, as shown above, truths as to which no experience, direct or indirect, specific or general, suggests a doubt. We may justly believe such truths to be final, but we must distinguish belief in finality from finality in belief. We may justly disbelieve that any reconstruction will affect the meaning or value of certain parts of our thought, but this disbelief does not possess final certainty. Final certainty belongs to attainment. It is out of place in the course of advance. In the meantime we have every reason to think that the principles of rational interpretation are founded on Reality. We need not think that, so far as we have formulated them, they are exhaustive of Reality.

CHAPTER VI

EXPLANATORY SYNTHESIS

(A) THE MECHANICAL AND THE ORGANIC

1. We set out in Chapter II a certain ideal of rationality in thought and practice and we saw that what must follow must be the enquiry, how far such ideals are attainable. So far as thought is concerned we dealt with the question in Chapters III to V, and reached the conclusion that the critical use of experience yields a rational interpretation of reality which by persistent effort grows in width and depth. We recognised that growth involves modification, but we argued that modification, being provided for in our principles, rather confirmed than weakened their hold upon our confidence. Hence on this side we held that the ideal of reason was attainable because founded on the nature of the Real. We have now to ask whether the harmony which we conceived as the ideal of reason in practice is equally attainable. If so it must also in a sense be founded on Reality, whether in the sense that it already exists or in the sense that it can be achieved through effort. To this question the many answers that philosophy has suggested may, I think, be ranged under three main types. On the one view, rational harmony is of the essence of the Real. It is there, now and always, to the deeper insight, and conflict, like contradiction, is at bottom only appearance. On the opposite view the Real is totally indifferent to the ideal, which is the product of the human imagination, a generalisation or sublimation of human purposes. If it is suggested that at any rate these purposes are real and within limits effective, the reply will take the line that

they, together with the whole work of mind, are at bottom mere epi-phenomena, true causation scientifically determinable being always at bottom mechanical. In their infinite variety mechanical combinations may give rise to ideas of nobility and beauty and even to events which correspond to those ideas, but they may equally well give rise to the ignoble and the ugly, and in fact they pursue the tenor of their way without the slightest regard to either result. Between these extremes there is a third view, that Reality is not as such a harmony but contains the conditions under which harmony is attainable through effort. This view implies that effort is a true cause and that, informed by ideals, it can effectually modify the Reality of which it is a part.

In the present and the following chapters I propose to approach these questions by considering Value, Purpose, and more generally the work of Mind in comparison with mechanism conceived as essentially process without mind. We shall begin with structures in which there is *prima facie* a purpose at the back of a system working mechanically. This will lead us to examine the organic system where a purpose seems to operate within, and we shall have to ask whether such a system is to be resolved finally into the mechanical or teleological, or is of a third and distinctive type. This again will throw us back on the further analysis of purpose which we shall argue is definitely contrasted with the mechanical while standing in intimate but complex relations to the organic. Underlying the whole discussion is the problem of explanation and the question whether any system which we can analyse does not at some point force us to look beyond itself for its basic principles.

2. On the surface, when we seek to explain any fact or object of experience, we seem to ask sometimes one, sometimes another of two very different questions. The ' why ' of a thing means either its cause or its purpose. Every explanation falls within one or other or both of these categories, of which the one is known as the category of mechanism, the other as that of teleology. Let

us consider the distinguishing characteristics of these two categories, and to do so let us take a case where either category is equally applicable. If we ask, for example, the explanation of the motion of a given wheel or lever in a machine, the answer may take two forms. First, it may be pointed out that the lever performs a specific function in the machine, it opens and closes a valve, let us say, which admits steam to a cylinder, and thereby governs the working of the engine. This is a teleological explanation, and that it is *prima facie* admissible in the present case nobody doubts. Let us see to what questions we are led if we pursue the enquiry on this side, if, that is, we follow the teleological line. We shall see that this line divides into two branches. On the one hand it leads us on into an enquiry into the mechanism of the engine as a whole. Our particular lever was, say, the eccentric that works a slide valve. Having ascertained how the slide valve moves, alternately opening and covering three apertures, we proceed next to the enquiry what this alternate process effects, and thereby to the structure of the cylinder, the piston and its connections on the one hand, and the steam pipe, boiler and furnace on the other. That is to say, we come to understand our original lever, the fact or part from which we started, as part of an arrangement fixed there to work in with the rest of the arrangement, determined, we may say, by the arrangement as a whole. This line of investigation then, as we follow it out, leads to an interpretation, as complete as we can make it, of a system of interacting parts. On the other hand, the system as a whole is governed by a certain purpose, which it serves in its completeness, and only in its completeness. The engine is to draw a train, propel a ship, drive a cotton mill or whatever it may be. The second line of enquiry which teleological investigation opens up is into the nature or value of this purpose, and here again the immediate purpose may be part of a system of values. It may conceivably be an end in itself, or it may be a means to an end, or perhaps a means to more than one end. Thus the immediate purpose of the locomotive is to convey passengers and goods. In a more ultimate sense it is, from one point of view, to facilitate the business or pleasure of the public, from another to assist in earning dividends for the company. Whatever it be, the enquiry into the why of the thing, pursued along this line, must lead us to something, simple or complex, to which as such, and not merely as a means to something else, we can attach definite value. It is, in fact, this last point that is essential to teleological explanation.

While a conception of value is capable of lighting up an arrangement of indefinitely great complexity, it by no means follows that complexity of arrangement is necessary to the useful application of the idea of value. On the contrary, many actions of extreme simplicity have a teleological explanation in the immediate pleasure attending on them. We walk or swim or look at a view for the pleasure of walking, looking or swimming, and though the biologist may tell us that there is in these things an ulterior value, we feel this to be in a sense a supererogatory explanation. It gives a reason why we should feel pleasure in the kind of exercise in question, but for the exercise itself the pleasure alone is a simple and sufficient reason. Teleological explanation is as such the reference of a fact, an object, a process to some end of value which it subserves. This value may, though it need not necessarily, appertain directly or indirectly to the working of some complex system as a whole, and if so, it is the point of departure from which the entire arrangement is to be understood, every element in the system being determined by the part it plays in interaction with others in contributing to the general purpose.

So far then as a system has value, every part in it is determined by relation to other parts. This determination has a very precise sense. Quite literally, this particular eccentric is to be seen at work in this machine, was cast and made true and pivoted on to its shaft because there is a slide valve to be moved to and fro and a cylinder with a piston moving back and forth. A modification in one of these parts may produce corresponding modifications. A different type of valve may require a different gearing, and a turbine postulates a wholly different arrangement. In a word, teleologically considered, the parts of an arrangement are not indifferent to each other. They are brought into existence, they are put together, they perform each its proper function as parts of a totality schemed on certain lines to produce a given result. In this totality each bit exists (*a*) because the whole has an end of value to subserve, (*b*) because the residue of the plan requires precisely this bit to be added to make up the whole. The absence or essential change of this bit must then involve either a modification of the whole, *i.e.* a change in, if not the total disruption of, its peculiar value, or a corresponding modification of the residual plan. It is in this sense that in any teleological arrangement the parts interact and involve one another.

3. So far the purpose of the lever, eccentric, or whatever the mechanism be. We have now to observe, secondly, that to the ' why ' of the process it is equally possible to give an answer on quite different lines. This lever has a reciprocating motion at the one end and a circular motion at the other, because it is screwed into an eccentric and pivoted to a reciprocating rod. The eccentric in turn is rotated by an axle, and so forth. To ask the ' why ' on these lines is to trace, not the purpose or function but the ' cause,' and to trace back the line of causation is to follow out the category of mechanism. The word is indeed something of a misnomer, since few arrangements, if any, are so clearly teleological in their entire nature as a machine. None the less, usage seems, in philosophical nomenclature, to have assigned the term mechanism for the category of explanation from which purpose is excluded. Let us endeavour, following the lines of this category, to compare the results point by point with the former. The first point that will strike us is what we may call the indifference of mechanism. When we asked why, *i.e.* with what purpose, the lever moved, the answer implicated the rest of the machinery and ultimately the purpose which its working subserved. When we ask why, *i.e.* for what cause, the lever moves, the answer is immediately, it is attached to an eccentric, and the eccentric rotates on an axle and the axle is turned by a crank and so forth. This line of

explanation also in one sense takes in the whole machine bit by bit, but after a different fashion. The mechanical causation of any part of the process proceeds without regard to the surroundings and without respect to the purpose or value of the whole. A given stroke of the lever takes place because the eccentric makes a turn or a portion of a turn. It does not matter whether the engine is working or whether the axle is turned by hand. It does not matter whether the lever is connected with the slide valve or broken off by a sudden accident, it does not matter whether the slide valve, being moved, will admit the steam in the ordinary course, or whether, owing to a dislocation, the motion is futile or harmful. These things will affect the permanent working of the lever. It will not continue to act if the machinery is deranged. But if we fix our minds on a given stroke and ask for its cause, it is a given turn of a particular axle. Given the physical connections, this causal relation will hold, and will hold without regard to any concomitant circumstances or subsequent effects whatever. If we were to analyse it down further into its elements, considering the strains and stresses on rivet and bar, the impacts, the pulls, the forces and resultants, initial and later velocities and so forth, we should in each case seek for a relation more and more atomistic, as it were, and self-contained in character. With more and more certainty as we made our analysis precise, we should be able to lay down without limitation, that given the cause the effect must follow, let all concomitant circumstances be as they might be. Thus, while the category of teleology leads us to conceive of each object, event or process as implicated with concomitant processes of some arrangement, the category of mechanism leads us to consider it as dependent upon, following along, its own peculiar line of causation, which, if accurately stated and fully known, holds its own no matter what the accompanying circumstances may be. So even if in tracing the cause of a given motion of our lever, we are driven back through axle and crank to take account of the entire machinery, yet all this comes into the account only as a part of the history of the movement studied. Each bit of the machine might be destroyed the moment it had performed that particular motion upon which the process that we are explaining depends. Provided that its motion was complete, our process will go through. The destruction which renders it teleologically absurd does not mechanically affect it. So in fact in a machine which is in some way out of gear, the mechanical continuance of some displaced process which is no longer fulfilling its true function may continue indefinitely, perhaps to the destruction of the machine. In fact, as the mechanical operation of cause and effect is indifferent to concomitants, so *a fortiori* it is indifferent to results or to values. For the *cause* of a thing we look always to the past. More strictly, we seek to retrace the effect which we desire to explain without break of continuity into the past, and it is this self-contained continuous strand of active being which, when for clearness we analyse it into an earlier and later, we call cause and effect. In tracing such a self-determined strand in time, we never think of the earlier as determined or conditioned by the later, for this would be to think of the existent as determined by what does not exist. We think of that which exists now as giving rise by continuous transition to that which exists later, as, in fact, *becoming* it, of its own nature and without the aid of any adventitious concomitants. This unconditional continuous becoming is the ideal to which mechanical explanation tends, and this once again is in direct opposition to the teleological conception, in accordance with which all the elements and constituent processes of an arrangement are indefinitely modifiable, and are in fact so modified as best to ensure the working out of a purpose which is subsequent to their action. Under the teleological category, in fact, it looks at least on the surface as though the future goes to determine the present.

Whether this first impression of teleological determination can hold in the end, we shall consider further at a later stage. We have first to point out that in our surface view both mechanism and teleology are together necessary for the full explanation of our lever. For merely to analyse the law of the lever's action is not to show how the lever comes to be where it is, while if we extend the 'mechanical' explanation so as to include the whole story of its formation and insertion into the machine, we shall have to take account of the engineer's mind and of the purpose which the machine is to serve. That is to say, the 'full' mechanical explanation will involve the teleological. But conversely, the teleological involves the mechanical. The precise function to be fulfilled by the lever is indeed prescribed by the purpose of the machine and the general arrangement, but the way in which this particular lever performs that function is to be understood only by studying its peculiar reactions. Mechanical actions are the units out of which the working process is constructed, just as the physical bolts and cogs are the units of which the arrangement, as a material structure, is built up. The full explanation of our piece of mechanism then must include both the analysis of its own operation and a statement of the teleological system in which it forms a part.

4. We have seen that our mechanical explanation is forced ultimately to take account of the constructive purpose of the engineer, in order to explain how the lever came to be where it is. It will repay us to examine further into this necessity. It does not arise immediately. We could, for example, take the action of the lever at a given point in its stroke and connect it with the whole configuration of the machine at the same moment. We could then, on purely mechanical principles, trace back its configuration to the preceding configuration and so on. It is only when we ask about the initial step, how this particular machine came into being and why it was set to work, that we are forced outside the mechanism itself to human hands and human minds controlling the whole. The reason why we are thus driven outside is that the machine does not explain itself. Its parts have, apart from their purpose, no intrinsic connection with one another. We can see that this rod works in that socket and is made to fit it, but we see at the same time that it does so only because it is made. The socket, as a piece of metal, does not intrin-

sically necessitate a rod working through it, nor the rod a socket. They are, as it is sometimes put, quite external, or, in our previous phrase, they are indifferent to one another, and it requires an outside force, the hand of a workman and the brain of an engineer to bring them together. To find that which in physical fact brought them into connection we must go to the purpose, which thus figures as the unitary principle connecting things otherwise alien. Conversely, as long as we disregard the purpose of such an arrangement or configuration we can explain it only by showing bit by bit how each element of it grows out of the corresponding element of a previous configuration. In such a configuration there is no principle of union and as we go back indefinitely we always find a ground for any one concrete event in an anterior event, but no ground of the combinations involved as combinations. Such unresolved combinations we call collocations.

We may, however, find grounds of combination which do not involve this infinite regress. First, some parts may determine others and so the whole, and these may be called mechanical combinations. Let us see to what this method of explanation will lead us. If we consider the combination of elements pqr, p and q together might be the ground of r, but unless p (say) is also the ground of q, we shall still have to account for the combination pq. For an internal ground, then, we must take one element as something indissoluble and it must be the ground of the others, *i.e.* it must always and necessarily have those other elements standing in a definite relation to it (pRq, etc.) as consequents. The relations may but need not be convertible, *i.e.* q may also be a ground of p, but this is not essential. Provided that p is the ground of q in the manner explained the combination has an internal ground and if p comes into existence from whatever cause then the whole pRq comes into existence. We may suppose variations in p and q, so that we might have $p_1R_1q_1$, and $p_2R_2q_2$, and so on, but any variations of Rq without a variation of p would imply that q is not entirely grounded on p. The union in fact is indissoluble. Few if any mechanical combinations are of this type. By a change in the distribution of the forces, every physical union can be broken up (even down to the atom). The hypothetical electron alone remains an indissoluble unity, if indeed it can be supposed to have parts which are even distinguishable. The atom is a combination of electrons formed by a nice balance of forces which, once attained, may indeed hold through geological periods, but nevertheless remains liable to be upset by the impact of other forces from without. And so with every physical combination; it rests on a preponderance of conservative over dissolving forces. Thus any particular combination, that is formed of given size, figure and position among other bodies, is due whatever collocation of electrons originally brought about to the preponderance of binding forces up to a certain limit, and, negatively, to the fact that the combination, once established, has encountered no collocation strong enough to destroy it. The generating collocation in its turn could only be ascribable to an anterior collocation, and it would seem that geological and even astronomical theories of the origin of structures work on these lines and under these limiting conditions.

There is, however, this to be added. The elements *p* and *q* of a combination may exist independently, yet be so related that if once within a certain 'field' they tend to fall into the relation *pRq*. This is the ordinary course of what has traditionally been called affinity, attraction, etc. If we add that the relation *pRq*, once established, maintains itself perhaps through a rhythm of variations upon *R* until dissolved by some specific external forces, we get the case of an ordinary mechanical system of a durable kind. The conditions of such a combination are evidently in part within the combination, *i.e.* in *p* and *q* and their fields, but they are in part contingent on the external forces which first brought *p* and *q* within striking distance and subsequently refrain from interfering with them so violently as to break up the combination. The parts supply some of the conditions on which the genesis and maintenance of the combination depend, but do not supply them all. In principle then it holds that the mechanical combination if not indissoluble is contingent on external forces in greater or less degree. This must be so as long as the elements are independent of the combination. Hence beyond complete solidarity all mechanical combinations involve collocations, and their explanation throws us back upon anterior collocations.

5. *The Mechanical and the Organic.* So far we have assumed unalterable parts whose interactions condition the combinations into which they enter and of course the behaviour of those combinations. But suppose that the combination determines the parts. This will mean that the part will at lowest act differently in different combinations, and it may mean that the part is conditioned not only in behaviour but in form and character, maintenance and genesis, by the whole to which it belongs. If we suppose such mutual dependence complete the parts could no more exist uncombined than the whole could exist without the parts. In organisms as we know them it is of course not so complete, for (*a*) as to genesis, divisions and new combinations may be said to occur in the birth of each individual and (*b*) in the life of the individual the interdependence of the parts varies very greatly as between higher and lower species. Still in varying manner and degree the parts are governed by the whole, and assume shapes and characters quite specific to the combination. In the result we have a system in which the parts *as they have come to be* are as much governed by the whole as the whole by the parts, and this relation corresponds to our ordinary conception of an organic system.

Prima facie, then, the organic system differs from the mechanical in that it consists of parts which are essentially alterable and are in fact modified by the whole. Does this modification involve any ultimate difference of principle or is it finally resolvable into some complication of the mechanical? To a point we all know that the living organism is comparable to a machine which, while performing various operations on the external environment has, both in these operations and in its internal changes, the maintenance of its own activity for its object. Whether, indeed, purpose as such is properly ascribed to organic activity is one of the questions to be determined, but it may suffice to note for the moment that the more definitely we conceive of the working of the organism as mechanical the more readily we are led to set a purpose outside of the mechanism as the controlling principle of the arrangement of its constituent parts and processes. But letting this point pass for the moment, what we have first to observe is the relation of these constituents to one another. Mechanically, the organism may be conceived, like any other machine, as essentially an arrangement for the transformation of energy. Thus the animal organism takes up energy in the form of food on the one hand and of oxygen on the other. For each process of absorption it has its appropriate mechanism, the alimentary and the respiratory organs. Next, it has to distribute what it absorbs by means of its circulatory system, and thereby to nourish nerve and muscle tissues wherein the potential energy of the foodstuffs is converted into energy of motion so directed through the central control as to secure fresh supplies of energy and at the same time maintain at the right point, neither too high nor too low, the temperature at which this persistent activity of change or metabolism can go on. Finally, the waste products which result have to be eliminated, for which purpose the circulatory, respiratory and alimentary systems, together with other special organs as the kidneys, again come into play. Of the reproductive functions we need not here take account. It is enough to recall in rough-and-ready way the picture familiar to common sense and elaborated in detail by physiology of the individual organism as a going concern in which a total process, the metabolism or life of the organism, is maintained by the co-operation of a series of parts, the final result of which, when it comes full circle, is just self-maintenance.

Now, at any rate as long as we ask no questions about origins there is nothing here to differentiate the organism from the well-compacted machine. In fact, the physiologist in seeking explanations of the life process moves habitually, and often with brilliant success, along the lines of mechanical explanation. Thus he can follow the circulation of the blood by conceiving the heart as a force pump and the arteries and veins as a connected system of elastic tubes. He may begin with the left ventricle, and show how the blood is expelled by a strong contraction which, closing the valves that lead back into the auricle, open those of the aorta. He will show that this new tide of blood, aided, moreover, by the contraction of the aorta itself, will propagate a pulse through the arterial system and force the whole blood stream along throughout the tissues. He will thus follow it through the branching arteries into the capillaries, observe its interchange of substance with the cells which it bathes, and thus account for its emergence from the capillaries into the veins in the changed character of venous blood. In the same way he will follow it back to the right ventricle and thence through the pulmonary circulation where it is restored to its arterial character, to the left auricle, and by the valvular mechanism to the left ventricle from which he started. Here the essential features are mechanical or chemical, and for our purpose we may assume that the chemical is, by methods which year by year come more clearly into view, to be reduced to the mechanical. Nor need we stay to enquire into certain points of the explanation which might present some difficulty to the mechanical view, by asking, for example, how far the interchange of substance, which is the essential point in the whole function, can be squared with the physical laws of diffusion, or whether the behaviour of the arteries can be wholly understood on the analogy of elastic tubes. We may better attend to points which, not by their obscurity but their clarity, emphasize the specific character of an organism. This circulatory process, for example, does not work with even regularity. If the body is thrown into violent muscular exertion the metabolism of the muscular tissue is proportionately heightened in order to supply the requisite amount of kinetic energy. This augmentation requires in turn an increased supply of oxygen while it produces a surplusage of oxidised broken-down proteids which have to be eliminated if the muscle is to continue to do its work. These requirements can only be met by an increase in the blood-stream, both to bring up the oxygen and to remove the waste, and in the healthy organism this supply is forthcoming through an acceleration of the heart and a dilatation of the arteries, which dilatation is, moreover, localised if a particular set of muscles have alone to be supplied. At the same time, respiration is quickened, so that the blood is more rapidly oxidised. The action of the heart and arteries then appears to be determined by the function which they have to perform, and the respiratory system responds in sympathy. Now this, on the surface, throws them into strong contrast with the parts of a machine, each of which, as we saw, must do what it does irrespective of the working of the rest. But it will hardly be supposed that the anti-mechanical view is to win so cheap a victory as this. We have to ask *how* the quickening of the heart and dilatation of the arteries is effected, and here at once a further and special mechanism is found. Heart, arteries and lungs are alike under the control or partial control of nerves, and these nerves are affected by the condition of the blood. Thus the respiratory nerves are traceable to a centre in the medulla, the activity of which is regulated by the hydrogen ion concentration in the blood. This is governed by the tension of the carbon dioxide in the blood which in turn varies with the metabolic activity of the tissues in general. By these intermediaries increased exertion brings about quicker and deeper breathing and so supplies the additional supplies of oxygen and elimination of carbon dioxide which it requires. As the normal state thereby is regained the stimulus falls off and breathing resumes its normal course. A similar self-balancing machinery can be indicated for the other processes concerned.

6. In these explanations, it is true, the phenomena of nerve stimulus and reaction have to be employed. These are peculiar to the living organism and have not as yet been reduced either to mechanical or chemical terms. But on this point once more we lay no stress. We take them pro-

visionally as mechanical in the sense that, given the muscle-nerve arrangement, stimulus A will invariably produce reaction α, and stimulus B reaction β, with no regard to results or concomitant circumstances. Once again we concentrate attention on the working of the process as a whole. What we find is that the circulatory and respiratory organs on the one hand, and the skeletal muscles which move the limbs on the other, are not, as in the ordinary machine, mutually 'indifferent.' The working of each is intimately affected by the working of the remainder. Not merely are they arranged once for all so that by a regular rotation each supplies or supplements the other, but on a far more complex plan they are arranged so that variations of their activity dovetail in with one another and maintain an equilibrium among an ever-moving set of forces. Whether through a subtle mechanism or otherwise, the result is reached that the several parts do not act independently but in mutual relation. Mechanical 'indifference' is replaced by organic 'consensus.' Bringing the two opposed terms down to their last analysis, so far as it is as yet before us, we may say that two parts *a* and *b* of a whole are mechanically related when the operation of each is uniformly determined by its own structure alone; they are organically related when the operation of *a* is itself affected by the effect which it has upon *b* and *vice versa*.

We shall have to return upon this definition very shortly and to ask not only whether it is satisfactory in itself, but whether it serves adequately to distinguish a living organism from a machine. It will be well, first, to remark most briefly that the consensus which we have recognised affects not only the daily and hourly working of the organism, but its structural growth. Just as between two functions so between two structures, modification is met with modification. Within the limits of organic adaptability alterations of conditions are met by a responsive growth of structure which, whether with or without some general modification of type, enables the life process to be maintained. In the first place, the normal development of the entire organism, and of every part of it considered internally, is a correlated development. Starting, as it does, with the division of a single cell, apparently through the development of certain centres and radiant lines of tension, the very first stage presents us with two cells determined in size, character, contents and position by the mutual relations, the relative tendencies of different portions of the substance of the mother-cell to hold together or to split. Each stage of growth involves essentially similar processes of cell division, and thus the gradual differentiation of parts out of a relatively simple and homogeneous structure is a process in which, take it where we will, each new element is a differentiation involving its complement. But further, the lines of differentiation are not absolutely predetermined for each individual embryo. On the contrary, experiment has shown that the mutilation of an embryo at an early stage may induce a far-reaching readjustment. In some cases, for example, the daughter-cell produced by the first division of the fertilised ovum, which normally develops into one half of the embryo may, upon the artificial removal of its fellow, be made to do duty for the whole. It may develop not as usual into the half but into the entire organism. Similarly, and on more familiar lines, any deviation of one tissue from the normal will involve a response on the part of other tissues. A curvature of the backbone alters the whole upper part of the figure, and a number of tissues must accommodate their shape accordingly. The cells of the skin, for example, multiply only so far as is necessary to cover the dwarfed skeleton. Similarly, in the adult organism, lesions and abnormalities of all kinds are met with special growths of suitable tissue. Constant use of the hands does not wear away their substance with friction as the surface of an inanimate object would be worn away. It stimulates the production of horny substance by the cells of the epidermis, and the result is a hand not less but better fitted for its work. The athlete's heart braces itself to its excessive labour by thickening its muscle. Even the bony tissues adapt themselves to special strains and alter their structure to meet new conditions. 'If the bone is broken and heals out of the straight, the plates of the spongy tissue become rearranged, so as to lie in the new direction of greatest tension and pressure; thus they can adapt themselves to changed circumstances.'[1] The elementary truth of practical life, that the living being grows and flourishes through and by means of its difficulties, dangers and toils, rests on this general reactive elasticity of the organism, that is, on the capacity of each part to adapt itself with structure and function to the needs of the whole.

7. Thus, alike in the growth, modification, and activity of vital structure, we see that close interdependence of part, or what is the same thing, that adjustment of part to whole which our definition of organic unity required. The question has now to be asked whether this interdependence may not, after all, be conceived in mechanical terms. May we not, that is to say, contemplate an arrangement, call it of organs, cells, molecules, or, if preferred, of forces such as (*a*) in response to normal stimuli will run a certain prescribed course, as a wound clock gradually runs down marking the hours the while, and (*b*) by special and highly intricate combinations will provide, within limits, for certain deviations from the normal. The nature of the provision may be set forth in this wise. Let us imagine elements A, B, C ... functioning normally along lines which we may distinguish as $A\alpha$, $B\beta$, $C\gamma$. Then it must be prearranged that a change α' affecting A produces a corresponding change β' in B, and this again produces γ' in C. The system $A\alpha'$, $B\beta'$, $C\gamma'$, we must suppose, will 'work,' that is, it will be able to maintain itself as a system just as the normal $A\alpha$, $B\beta$, $C\gamma$, can do. The simplest case, in fact, will be that in which the effect β' is such as to react upon α' and tend to reduce its divagation from the standard α. This is the case, for example, with the repair of tissue or with the adjustment of the balance of oxidation in the example which we took. Somewhat more complex but still intelligible enough is the case where the organic structure is in some measure modified, but without losing its recognisable identity or interrupting its life process. In this case β' and γ' do not

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[1] Weismann, *Romanes Lecture*, p. 15.

tend to neutralise α', but rather to complement it. They are the modifications in β and γ required by the change in α in order to maintain the moving equilibrium. This is the case of the broken bone set crooked, which, to maintain its function as a whole, modifies the lie of its component parts so as to meet the new lines of strain.

Some such compensatory arrangements are undoubtedly observable in machines. The ' governor ' of a common steam engine, for example, is a device whereby excess of speed, due to a sudden diminution of resistance, corrects itself by closing the throttle valve and diminishing the supply of steam. The ' compensating pendulum ' maintains the resultant length of the pendulum unaffected or almost unaffected by changes of temperature. The very change which disturbs the balance in one direction is made to call into being a process which redresses the balance. More generally, in any self-acting machine, it may be contended that as soon as we consider its permanent operation, there is not that ' indifference ' of parts which our definition postulated. Thus in our own example, though any given movement of the eccentric follows ' mechanically ' on the turn of the axle, no matter what is happening to the rest of the machine, yet if we look at the normal working of the mechanism as a whole and consider the conditions on which the recurrence of this particular motion rests, must we not, after all, admit that it is precisely its relation to the remainder, the fact that it is connected up with a steam cylinder and its appurtenances that keeps it in being ? Must we not say that as truly as in the living plant or animal, the working of the slide valve gear is determined not wholly by its internal structure but by the effect it has on the remainder of the arrangement ?

The obvious reply is that the self-acting arrangements are teleological. They are devices of the mind which made the machine. This point taken by itself would remove all self-maintenance from the sphere of mechanism to that of teleology, but to a teleological cause which is ' outside ' the system. Now there is a limit to the action of such ' external ' teleology. The inventor can devise a self-acting machine and even a machine which compensates for foreseen deviations from a norm; but he cannot devise a machine which will provide its own compensation for deviations which he does not foresee. His machine must be one in which every part will give its fixed type reaction to every type force impressed on it. The organism does not appear as rigidly tied to such conditions. Within limits it appears to make its own adaptations to varying circumstances, as though its purpose were within. If we include the largest purposes that the human brain can conceive in the field of organic activity, the limits of variation in behaviour are very wide. If we include only that which is common to all organisms they are narrow. But do they entirely disappear, or is there in the organism as such some power of self-adaptation which differentiates it from a cunningly made machine? Let us attempt a definition of the organism which will serve at least to bring this question to a head.

8. An organism as a whole of distinctive character depends on a union of parts which are themselves conditioned by the union. This mutual dependence is not absolute. In any organism we distinguish vital parts, a loss of any one of which destroys the organism, and other parts which may be destroyed without very seriously affecting that which remains. Still there are parts whose standing union is the condition of the maintenance of the individual. Again, in low organisms the parts can live separately. But as we pursue this line we find the distinctive character of the whole fading away into an inessential, quasi-mechanical conjunction. In proportion as the organism has distinctive individuality, the parts are dependent for their actual character and behaviour on their membership. But even when the parts die on separation from the organism, their material elements remain, *i.e.* there is always something that belongs to the parts as such. Thus in general each part has its own character, which is one determining condition of its behaviour and its dependence on the remainder which is the residual condition. Thus if the parts maintain the whole as it is, it is equally true that the whole maintains the parts as

they are, and as a consequence each part may be said to maintain the others in their character as members of the whole. There is mutual dependence. It must be borne in mind here that the whole consists of nothing but the parts in their specific relations. It is not another part added on to them. Any part, then, in the character which it possesses and the behaviour which it evinces, rests on two sets of conditions: those which belong to it as such, the internal, and those which derive from the other parts of the whole, or as we may better express it, from the whole as constituted by other parts as well. The part, in fact, is intrinsically a conditioned being. It is not wholly self-maintaining, but its character is also dependent on conditions supplied by other parts. These conditions are the requirements of its maintenance and we shall speak of them by that name. Now if we conceive a whole W, consisting of two parts and two only, AB, and if this whole maintains itself through some stretch of time, it is clear that during all that time A must supply the requirements of B and *vice versa*. If W were unchanging and independent of anything external, we should have a very simple form of interdependence, but we should hardly have the peculiar characteristics of an organism. The living organism is essentially something in process. It undergoes change, though a change compatible with its maintenance as a whole and that with an identifiable common character admitting of specific differences. Not only so, but as A and B are distinctive parts each with a character of its own, and as W is never in fact isolated, but is subject to the operation of external things, it is clear that A and B may react differently to such things; hence in any given case it might be that the reaction of A would not be such as to yield the requirements of B, and if that were so the organic union would perish. This may and does occur, but we also find, and this is the remarkable characteristic of an organism, that the response of A is modified in accordance with the requirements of B, so that in changing circumstances its behaviour remains constant in this relation. These phenomena lead us to conceive the requirements of B changing as they do from time to time, as themselves conditions of the behaviour of A and, extending our view, of the growth, development and maintenance in which all the momentary actions and reactions are summed up. We conceive an organism as a union in which the parts are conditioned throughout their existence by mutual requirements.

9. This definition, however, leaves two important points to be explained. First, in what precise sense is the requirement of B held to condition the action of A? Requirement is a term pointing to fulfilment, that is, something which perhaps is to be, but at the moment is not. If a rational being so acts as to meet the requirement of another we can very well think of him as being determined by the fulfilment as his aim, *i.e.* he acts purposively. Are we to apply this conception here and say that in an organism the part acts teleologically, *i.e.* that the behaviour of each is determined by relation to a result which is the fulfilment of another's requirements? Or shall we say that it is not in strictness the requirement of B that acts on A as an end but the physical condition which exists in the lack of it which acts as a stimulus and should the phrase ' determination by mutual requirements ' be read in this sense? So read, it implies no purposive action. It is a physical state, say the lack of oxygen or the excess of carbon dioxide, which acts as stimulus to the more vigorous absorption of oxygen or elimination of carbon dioxide. In so far as B's requirements are so correlated with physical states of B that these act as stimuli to A to meet the requirements, the effect will be the same as if A's acts were determined, like a purpose, by intelligent appreciation of their relation to the requirements. Thus our definition would cover the two very different cases of true teleological co-operation and of a highly complicated mechanical co-ordination. There seems to be no third alternative required. Parts of an organic whole may be conditioned in their behaviour by mutual requirements, either through direct teleological co-ordination or more indirectly by a complex co-ordination of mechanical stimuli and responses. The mere fact that mutual requirements are

within some limits fully met is not sufficient to decide the method by which they are met. For this we must look to the detail of the case in relation to the possibilities of mechanical contrivance on the one side and of teleological activity on the other.

The second point is that in thinking of an organism of two parts only we are simplifying too much. Organisms in general are complex and as we add more parts we have more stimuli to adjust. A will have (to put it teleologically) to consider not only the requirements of B but of C or D or any other part of W, and these requirements might not be easy to harmonise. For purposive beings this is a sufficiently familiar situation and for its successful treatment it needs some sort of central co-ordination. The various requirements must be compared and co-ordinated with one another, *i.e.* must be brought into one system, and that by some agent which has the interest of the system as a whole to maintain. In the organism there is certainly co-ordination, whether with or without purpose, and there is a centre or linked system of centres such as we found in the nervous system. There is an arrangement through which the whole co-ordinates the actions of its parts so as to meet its requirements as a whole. This definition has certainly a teleological appearance, but in view of what has been said of the possibility of representation of requirements by physical states, it must be recognised that this explanation still remains open. Only as the complexity of the necessary adjustments increases so also does the marvel of any mechanical pre-arrangement. We must now not only have any requirement of B reflected in some physical state of B which acts as a stimulus to the central system S but the same must be true of the requirements of C, and there must further be an arrangement as between B and C such that in responding to the one, the other is not neglected, and the relative importance of the two in the conservation of the whole must be observed.

If we assume for the moment the mechanical view we may suppose the adjustments which it requires to have different degrees of adequacy. It would move towards perfection in the first place (1) as the physical condition of a part lacking anything operated as an adequate stimulus to the rest of the organism to fill the need. The stimulus should be finely graded so that the response would be sufficient and no more than sufficient. Beyond this (2) there must be an adjusting mechanism in the centres holding such a balance between all afferent stimuli that all needs, however divergent, are met in proportion to their urgency. In its perfection these adjustments would accurately correspond in their outer appearance to the operation of a system governed by the purpose of maintaining its being from moment to moment. Thus between a perfected mechanical system and a teleological there seems no intermediate arrangement. The question between mechanism and teleology is this: could a mechanical arrangement meet all the individual changes of requirement, as well as organisms do? Conversely, can an organism be in any intelligible sense conceived as governed in its operations by a purpose?

The position to which we are brought then is this. We take it as an empirical fact that organisms exist composed of distinct parts which are conditioned in their behaviour and ultimately in their growth and even their original differentiation as distinct entities by mutual requirements. But we observe that in regard to its *modus operandi* 'a requirement' might be interpreted in two ways involving two radically opposed conceptions of the mode of causation. On the one interpretation the requirement of the part B being *b*, it can only be met by the reaction *a* on the part of A. The *modus operandi* is this. In the absence of *b*, B is in a physical state which stimulates the centre S which controls A and by a pre-existent system of co-ordinated reactions, secures the response *a*. There is nothing to show that this series of reactions is more or less mechanical than any other reactions to stimulus. On the alternative view, the lack of *b* is directly operative in the whole W, of which both A and B are parts, in the form of a want and an effort to relieve it. There is something, *b*, not at the moment in existence, which is wanted. The want sets in motion a process which will in fact produce *b*, and it is this fact which makes the want set this particular process going. The act is determined by its relation to its own result or outcome. In other words the End is operative in the process, it is teleological.

As applied to the ordinary processes of bodily life, the latter explanation would seem to imply far too much intelligence on the part of the organism. We shall consider later the possibilities of any *via media*, but it would be useless to enter upon this question until we have considered the radical objection to teleological explanation in general.

CHAPTER VII

EXPLANATORY SYNTHESIS

(B) THE ORGANIC AND THE PURPOSIVE

1. In quite general terms teleological explanation is the reference of things, acts, processes, to their value as a ground. There are simple cases in which a certain value seems inherent in an act or experience, *e.g.* in any healthful exercise of faculty. In such cases the difference between the thing and its value is merely one of aspects. But more generally, value is some special feature of a whole in which there is much that, if it did not serve this feature, would be indifferent, that is, we have the distinction of ends and means, and here it is that teleological explanation becomes important and involves difficulties. Thinking teleologically, we refer the means to the end as the condition of their existence. But this implies that the means are also conditions of the end. The relation is mutual. If such a system were permanent and no question of its genesis were raised, no special difficulty emerges here. It would be an ideal system in which the parts implied one another. But when we consider such systems as arising and maintaining themselves, perhaps imperfectly and with difficulty and often being finally dissolved, the case is otherwise. Here the question arises whether their relation to the end is a condition of the existence of the means or whether the end is merely their consequent but in no sense their cause. The mechanical view is that the means have their causes in anterior events and that in certain collocations they produce results in which we find value. The value is a consequent upon the collocations, but not at all their

condition. The teleological view is that the collocation was formed because of its value which also sustains it when formed. It is thus in process, whether of genesis or maintenance, that the question whether its value is a true condition of the valuable system is important. And it is in relation to genesis that it seems to run into paradox. For if the value is a condition of its own genesis it must act before it exists. To mitigate this difficulty we treat the value as the result of a pre-existent purpose. But if we are to preserve the teleological view we must, it would seem, conceive the purposive activity as conditioned by its relation to the result, and whether we can legitimately do so is the question to be determined when we ask whether teleological explanation is admissible. It must be added that if the paradox only becomes glaring in relation to genesis, it is equally real in respect of maintenance, at least in such cases as that of the organism; for if life so acts as to maintain itself, the maintenance is at any moment a future result, and the meaning of the proposition is that the performance of the vital function is conditioned by this result.

Now, it may be said, first, that this determination of a process by a relation to its result is utterly impossible, and, secondly, that every apparent case of such determination may be explained by a structure which has come into existence adapted, in accordance with mechanical laws, to yield the required result. On this last point it may be remarked that so far as the organism is concerned the question is not merely how it comes into existence, but what it is and how it acts, and if a thing so acts as to be determined by the relation of its function to its effect, it is acting teleologically. The question then is whether such action is possible. If no, then every apparent case of it must be resolved into a mechanical adjustment which simulates teleology. If yes, then we may approach any case without prejudice and decide whether it is one of genuine teleology by an inductive determination of the actual causation at work within it. We have then, first, to ask whether there is any possible sense in which a process can be conceived as determined by relation to its result. As a mode of speech we all understand what it means. If I hail a cab to take me to the station, catch the down train and get home in good time for dinner, the dinner and all that appertains thereto and the hour for which it is fixed, may be spoken of as the determining or governing fact of my whole procedure. But can this for a moment be regarded as an ultimate analysis? At the time when I hailed the cab the dinner is non-existent. Does the non-existent cause the existent? It may be that in the eternal scheme of things the dinner is fixed, and I might, though by a somewhat desperate device, take what is to be as equally real for causal purposes with what is now. But even granting so much, how could we deal with the purpose which is not realised and the dinner which does not come off? If the cab breaks down or I break my leg in getting out of the train, the dinner which seemed to have determined my behaviour was not, after all, written down for me in the beginning as a part of the scheme of things. Not only was it non-existent at the time of its alleged causal efficacy, but it never came into existence at all. It had no place in that framework of things in which it was called on by our teleological category to play an unassuming but not irresponsible part.

These difficulties, we shall surely be told, arise only from a childlike acceptance of ordinary ways of speech. The future is in no sense a true determinant of the present. In a causal relation the antecedent is always an existent, and in a teleological system which the ultimate result appears to dominate, the true controller is a mind animated by an idea which does indeed project itself into the future and guides events in accordance with the lines of projection, but as an operating force in the disposal of events is an ever-present agent, acting by its presence alone. It was the working of a mind as an external agent which we assumed always as the explanation of the arrangement of parts in a confessed machine, and if a mind can make a permanent arrangement which by regular action can secure a certain result, so with more plasticity and closer attention to detail it can guide systematic operations which will be able to deal adequately with the shifting requirements, the changes and chances of more complex mutual conditions, and select always out of many possibilities the actions best adapted to the furtherance of a particular end. In short, where there is systematic co-ordination apparently dominated by an end, there is in reality a mind inspired by a purpose which is the present operating force, and if we are right in conceiving organic adaptation as determined by its results, that must mean that we conceive the living organism as so far endowed with intelligence. But there is no such thing as determination by the future or by relation to the future. A formed purpose may be a cause, but it is also an effect. It is something that grew out of the past and acts now just as any mechanical configuration arose out of the past and acts now. The past wholly determines the future and is in no sense determined by it.

The criticism to be passed on this account is not that it identifies teleological action with the action of mind. On the contrary, this identification is at least probable and may be provisionally assumed. Nor is it that it insists on the present existence of the cause at the moment of its operation. This existence we must assume. The criticism is that the account gives no analysis of that relation to the future which it admits in the activity of Mind. It sets out to exclude the future from causal operation, yet it can explain the action of Mind only by speaking of a projection into the future. Thus it leaves a contradiction standing which we must resolve if we are to understand teleology and the precise point of its distinction from mechanism. We have still to ask, then, can anything causal, be it mind or be it what it may, be conceived as in any literal sense determined by relation to its result ? The point is fundamental, because if there exists anything of this kind, then also there exists a mode of causation differing fundamentally from the mechanical, and if not, mental, purposive, operation is itself ultimately mechanical.

Mechanical causation is a continuous process in which each phase is determined wholly by that out of which it issues and in nowise by that into which it will pass. This indifference to what is coming is the other side of that indifference to concomitants which is the external feature distinguishing the mechanical in general from the organic, and which mechanical theories of the organic have to overcome if they can. Thus, if a book be pushed along the table till it fall over the edge, the resultant motion before and after the critical point is wholly different, but the effect of the push as such, precisely the same. Before, it was compounded with two forces (the weight of the book and the support of the table) which were in equilibrium. Now the support of the table being withdrawn it is compounded only with the weight of the book, but is still recognisable to kinetics in the curve which the book describes. If the push were a purposive effort to bring the book to some point in the direction to which it tends, it would at the table's edge abruptly change its method, but regarded as such an effort it is futile. Water acted on by gravity falls into a pool and remains there. If, for a moment, we imagine the brute force of gravity to be in reality a desire to get to the centre of the earth, we might say, if the water had but the sense to hold itself up but a moment longer it might have gone over a ledge of rock and fallen many feet further. But in any mechanical tendency, however persistent, arrest even by one moment is fatal. There is no going round. Now this going round to get to a goal is precisely what we do find in the operations of conscious purpose, and it is this which justifies as a descriptive statement the formula that purposive action is determined by relation to its end. *Prima facie* the matter is one of a straightforward application of inductive methods. Here is an action A which tends to an end α. In varying circumstances BC, DE, the action A is performed and α secured. Conversely, in circumstances FG, HK, A does not serve α, but A′ does, and now A′ is performed. It is, *prima facie*, a sound induction that the tendency to produce α is the cause of the action, and the inference is applicable to cases, *e.g.* of animal behaviour where there is neither internal consciousness of purpose nor language to tell us of purpose. But this raises the preliminary question whether it is possible that the tendency to the result should determine the act, and if so, in what sense. Now, if we look at any of the means used by an intelligent agent, be it a material tool fashioned for a purpose, or a course of action chosen with an object, there is a clear sense in which we may say that these owe their existence to their relation to the effects that they produce. The tool has been made, has been brought into existence by the agency of the intelligent artisan, because of its efficacy for his end. Not indeed the end itself, but the efficacy of the thing towards the end is quite literally a condition of its being. The same argument will apply to the performance of acts in a purposive series. Act or instrument owe their existence to something pre-existent, a purposeful intelligence, but the link is their causal efficacy. They are brought into being as the starting-points of certain trains of causation which are to be gathered together in the general purpose.

2. So far there is little difficulty, because the mind in which we place the centre of the teleological system is conceived as standing outside the instrument and shaping it, operating upon it as any other existent cause may do. But this operative organising activity is not restricted to the external. Within the mind, so far as any given purpose possesses it, feelings, impulses and thoughts come under its moulding power. Even the emotional interest in the end itself is mastered and moderated if its excess interferes with the steady movement requisite to secure the aim. The purposive mind presents itself, in fact, as an organised system of elements—organised for the production of a common end. Whereas in a field of mechanical elements we have a set of forces subsisting side by side, each producing its own effect without regard to the rest, and unaffected by the resultant character of the whole process which their interaction forms, in the case of purpose we have a system of elements in which the part played by each is subdued to the requirements of the whole. The system, in fact, has an organic character. It moves as a whole to an end, shaping its elements at any stage to suit the common requirements at that stage, and the requirement is always for efficacy towards the end.

But here we touch the centre of the problem. We have seen that this method of determination has a clear and consistent meaning as long as it is applied to means, or even to psychic elements in a whole, as long, that is, as we could conceive the purpose as something acting upon and shaping them. But to conceive the purposive consciousness in this external fashion is to destroy its organic character. What holds of the means, however, will be seen on close analysis to apply also to the mind, which uses the means. The means come into existence, we agree, on account of their causal efficacy, as starting-points of certain lines or streams of causation. Now if we look at the purposive state as we know it in ourselves, we say familiarly that it is guided by an idea of the end and of the way and means thereto. This idea is a forward-looking something; its relation to the future, to what is to come out of it, is an integral part of its being. It is, we will not say determined *ab extra*, but constituted by this relation, this element of movement which it contains. But the forward-looking idea is not the whole of the purpose. The idea must interest, arouse feeling, dominate impulse. The purposive state is an impulse-idea, a conative state, an *idée-force*. It is forward-looking, but more than that. It is forward-moving, directive.

At the core of this forward-looking movement is the state which may perhaps be most simply and generically described as a Want, something which present conditions do not satisfy and which impels us to seek (or it may be resist) change. In an intelligent being the want is defined by an idea and, thus defined, becomes an Effort towards an End. The idea is a system of references based on the actual situation and the segment of oncoming reality arising out of it, and suggesting modifications within that system leading up to and meeting in the End. The moving energy of the Effort is defined in direction by these references, and in this it is distinguished from the mechanical system. Such a system certainly has direction at any moment, but the direction is completely determined by the forces acting at that moment, and among these forces no reference to any result coming out of the momentary change plays any part. In the case of a purpose such reference, which may extend without definite time limit into the future, is among the conditions of each act. Such references of course do not define a future which is coming about of itself; they define the phases of an effort. Every individual phase of the effort, from its first inception to its satisfactory conclusion, is conditioned by conformity with the ideal scheme. Upon any discrepancy it is arrested and modified, while as long as it is in conformity with the scheme, each stage has the whole force of the effort behind it. The purpose, that is, is a unity or a system which determines each several process that falls within it in accordance with the requirements of the whole. The common requirement is conformity with the direction of the ideal system as leading up to an end.[1]

But the ideal system itself is also open to correction. If, as it proceeds, a discrepancy arises between the tendencies which it now finds (whether these arise from sources outside its original purview or out of processes which the effort has itself brought into being) and the End to which it is directed, its scheme is modified. The End is approached from a new angle, and in that sense perhaps the whole direction is changed, though the goal is constant. Thus the ideal system is itself conditioned by conformity to the Want or central impulse which, acting in a mind informed with ideas, initiates and continues to control it. Finally the Want itself may be modified (content itself with a new form) if the advance of the effort proves that this is the only (perhaps the merely partial) satisfaction which circumstances allow. Thus every element in the system is modifiable by relation to the Want, and the Effort, though persistent, does not act uniformly but contingently upon the varying factors that arise in its course and may be its own creations. It is not merely directed like the processes which it sets going. It is self-directing.

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[1] This direction may of course be misjudged, in which case the purpose fails—does not act as an executor for the want in the scheme of things. Now we could not in such case say that it was its real relation to the end, its actual tendency to bring the end about, which was a condition of the performance of a given act. Yet we must allow the whole process to be purposive as long as conformity to the direction of an ideal system is the constituent of each step, notwithstanding that there was a contradiction between this direction and the real tendency of things. On the other hand, when and so far as the ideal system is founded on knowledge of the real tendencies of its processes it is true to say that these processes are each founded ultimately on their conjoint tendency to yield the End, and this will hold even of purposes that are but partially effective so far as concerns the steps to the end which they bring about on the basis of a sufficient knowledge of the conditions of the achievement of those steps. In general terms, however, conformity of all the movements of effort to the direction defined in an ideal system is the essential of purpose.

Thus the purpose is a movement in which each constituent process is conditioned by conformity to the direction of an ideal system of action, originating from a want, which system is itself conditioned by conformity with actual processes, including those which its own operation brings about. In every such modification of the system, however, the final determinant of the direction (the maximum satisfaction of the Want) is constant.

3. Thus the purposive process is distinguished from the mechanical, first in the nature of its direction. In the purposive process every phase is determined by the direction of the whole system. In the mechanical process the direction of the system is the effect of the continuously successive phases. In the purposive process the direction is maintained by controlling elements, determining constituent processes in accordance with judgments of their tendencies, and themselves subject to similar control. In the mechanical process any control consists in the immediate reaction of one part upon the actual processes of others.[1] Hence in the purpose, so far as effective, the actions of some elements are determined in accordance with the actual tendencies of others. In the mechanical process there is no such determination. In the purposive process nothing is definitely fixed in the initial stage except the End. The working of the ideal system may be modified by forces not originally taken into account, but its direction is preserved. In a mechanical process the initial stages determine the whole subsequent course, if

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[1] In a machine in which a control is purposively arranged to secure a constant direction, it must be arranged to respond to realised processes. It cannot be affected by their tendencies.

no external forces impinge. If they do, the conjoint result is not determined in accordance with the original direction. Hence, in particular, a system of mechanical elements may be purposively arranged, which, if no unforeseen force impinges, will inevitably reach a given result by running without variation a given course. Further, such system may provide for foreseen possibilities of variation, provided they can be dealt with by uniform responses to realised processes. Unforeseen impingements cannot thus be provided for. In the result, in a purposive system every constituent has its place determined by its character in relation to the resulting character of the system as a whole. In a mechanical process it is determined by the interaction of previous constituents without relation to the resulting character of the combination as a whole. In sum, in a purposive process every phase is conditioned by a factor referent to the outcome. In a mechanical process there is no such factor.

This factor, as we know it in human purpose, involves a system of judgments of the tendencies of acts. If these judgments are correct and rationally grounded they coincide with and are founded on the real tendencies of the acts. In such case it is correct to say that the act itself is conditioned by its own tendencies, but in unsuccessful purposes or inadequately reasoned purposes this would not hold. Hence in a general formula we do not speak of the act as determined by its tendency to the result but by a factor referent to the outcome, and by the outcome we do not mean the intended result merely, as this may not come about, but the segment of reality emerging from the given situation and the effort, whatever this may turn out to be. The ideal system of the effort is a reference to this segment, though a conative reference, not merely anticipatory but endeavouring to shape it.

The existence of such a factor of reference explains the direction of a series of actions towards a result. If conversely we find in experience evidence of such direction, we reasonably infer such a referent factor unless we can find in experience any other method by which events can be so directed. Experience does not suggest any such method differing in principle, but it does suggest less explicit references than those of distinct and definite judgment. This suggestion will be considered presently. With this reserve we may lay down that in so far as events are conditioned by their tendencies to a result they are so determined by a factor referent to those results, *i.e.* teleologically.

If the purposive process succeeds, and not merely succeeds in fact but does so because the idea of the purpose knowingly grasps and controls all the relevant conditions, the end will be realised, and its realisation, future event though it be, is a true condition of the operation of the purpose. For, since all that bears on it is known to the purposive mind, and this is determined in all its acts by their relations to the end, the acts would be other than they are if they were not in fact links in the chain leading to the end. If the end were not to come about, then the conditions of foreknowledge and power which we have assumed could not be. Thus in what we may call the self-contained purposive system not merely the tendencies but the end itself is a true condition of the cause by which it is brought into being. The system, then, forms an organic whole, not only in the sense that all contemporaneous parts condition one another's action, but in the sense that its successive phases are equally conditions one of another.

This account of purpose is only set into clearer relief by the explanation which would reduce it to mechanical categories. The evolutionist will tell us that the biological reason why certain purposive tendencies exist in the living being is that they form the arrangement best fitted to secure certain results of value to the life of the species. Be it so. Then this shows that, however the purposive consciousness has come into being, its nature is so to organise things as to secure results, and that *its efficacy in securing results* is precisely the cause of its arising wherever it has arisen. It may be objected that an abstraction like causal efficacy can explain nothing. But, of course, the causal efficacy always has some concrete shape. It is the edge by which it will cut that determines the shape given to the tool. In the purpose it is an organisation of elements of thought and feeling, of physical acts and of external things that constitutes the efficacy of the action. The purposive state has historically come into being, because that sort of organisation does yield that sort of result. It is maintained in being by its own knowledge that it is tending in this direction.

4. I conclude that the main objection to teleological explanation is not sustained. There is an intelligible sense in which events or processes may be regarded as determined by their relation to results which are to come out of them in the future. This explanation may be applied to an event or series of events arising out of a purpose, but so far as the series is merely referred to a purpose that appears to stand outside it, the events seem to follow from it as a mechanical sequence. The explanation, however, can also be applied to the purpose itself, and when the originating purposive act is brought into the account, the whole system—the purpose, the train of events which it sets up and the ultimate end are seen as a whole in which each element owes its existence in the shape and form there assumed to its relation to the result. The system is directed from within towards an end. Mechanical systems may be directed, but not from within, only by purposive intelligence so arranging them. As operating mechanically they have no constant direction to an end independent of the variations of the moment. Such direction constitutes the fundamental difference between the purposive and the mechanical.

Our account then throws the purposive into radical contrast with the mechanical, while allying it with the organic. The alliance, however, is not identity in definition. The organic relation is that of mutual necessitation, the purposive, that of determination by relation to ends. But in the purposive scheme the relationship of the constituents is of organic character, and the purposes that we know are framed by organisms and have reference to their needs. Again, in their basal activity, organisms are certainly not guided by purpose in the full sense, but in so far as denuded of purpose they are limited in their adjustments to the stimulus of immediate requirements, and for this reason they could not live if they did not inherit a structure which in main outlines determines their reactions in a way suitable to their maintenance. On the other hand, endowed with purpose they can extend their correlations indefinitely through the whole sphere of life, thus fulfilling the organic function far more completely. So considered, purpose seems to be the flower of the organic principle. Yet we have had to admit the possibility that living beings might be mechanically constituted. If so, the greatest fissure in the universe occurs not below but within the living world. Before we accept this fissure in the organism let us recur to the development of purpose and see whether we can trace it to a germ which may be conceived as operating throughout organic life.

We begin with the known lower types of conation. These differ from Purpose in that no explicit reference to the end is present, and without such an idea it is difficult to see how the detail of action could be controlled so as to bring the End about. Is there, then, any way in which the relation of the end operates save through explicit ideas? If yes, the conation in which such operation appears, though distinguished specifically from true purpose, must rank with it generically as teleological. If no, it must rank generically with mechanism. The question is important in the whole of the lower sphere of mind in life.

We may approach it by remarking that at least two conditions are involved in purpose. The first and most elementary is that there should be a state of activity making towards some result (what we have called an Effort, issuing from a Want). The test of this condition is that the state determines actions by their relations to the result in question. Such determination may be more or less adequate and effect a larger or smaller number of factors, and that more or less completely. The difficulty is to see how it affects any of them except by a judgment as to their bearing. Now, if we consider a simple want as such and the effort to which it gives rise, we may say that persistence and repetition of effort till the result is achieved, its discontinuance in a given form if fruitless, and its renewal in another form till satisfied, are acts determined by the relation to the result, and that not in the general sense in which type actions are adapted as a class to certain results as a class, but in relation to the particular circumstances of a given situation, and the result to which they tend as then and there performed. Such a Want is in fact the centre of the purposive system itself, but it is there informed by an idea which is the second condition of true purpose, and can direct the variations of its activity accordingly. The question therefore is whether there can be such a thing as effort directing actions without the use of ideas—*i.e.* judgments of their tendency. How should we distinguish such effort from mechanical response to stimulus? We know that the organism in general is a structure fitted, whether by heredity alone or heredity modified by experience, to deal with many stimuli, external and internal, in a definite manner, running through a course of reactions, brief or very lengthy, to a determinate result, on the attaining of which that particular process comes to an end. In some cases the evidence which we brought forward in an earlier chapter shows that these reactions are mechanical. The structure must then resemble a machine made with a purpose, and the difficulty of so conceiving it led to the evolutionary hypothesis, which has been adopted here and which refers the product to the operations of heredity. For the moment, however, we are not concerned with the question of origin, but with the mere fact of the existence of a structure which so far resembles a machine that its initial character determines it to run a certain course in response to certain stimuli. But at least in the human organism there are structures whose operations are accompanied with mental phenomena—states of consciousness—and in some of them we have argued that the consciousness has a decisive effect in the course actually taken. We must then regard the human organism as a whole as at once physical and psychical, or psycho-physical, and we act consequently in regarding as psycho-physical any one of its processes in which we find evidences of consciousness. Any such process may be regarded as issuing from a psycho-physical instead of a purely physical structure, having its prescribed methods of operation. The purposive system is such a structure (its character as we have described it being that a want gives rise to an effort which defines itself in an ideal system from which it directs its own activities and, through them, other things, to a definite end). This manner of proceeding we have shown to be in radical contrast with that of a mechanical structure, but a structure it remains, only one which defines its end and governs its activities with that end in its view. Our present question is, are there other psycho-physical structures not operating through ideal systems yet distinguished in their operation from the mechanical? The test must lie in the relations between actions and their result, and in this respect we have in Part I. distinguished several cases.

If, in the first place, we try to consider effort bare of all direction to an end, how should we distinguish it from a reflex response? We shall not be content with mere internal consciousness of it as an impulse, for we are concerned with its operation and the results to which it tends. If it has not, like purpose, any inward direction of its own, why does it take one course rather than another? We must surely say that it is the response fixed by the pre-existent system to a given stimulus. Such also is the reflex. The most elementary difference to be discerned is, I think, that effort persists while unsatisfied, and ceases upon satisfaction. It is therefore not determined in magnitude and direction *a priori* but by the result. If this is so, relation to the result enters into effort from its very lowest manifestations, and this is I think in all probability the true account of the matter; only we must admit that it will be hard to distinguish it from a psycho-physical reflex with certainty, as the reflex might be continuously sustained or repeated by the continuance of the stimulus. Let us go one step higher. Conation not only maintains itself till satisfaction or exhaustion supervene, but it also alters its methods. Its structure is such as to offer it alternatives, first prompting one of them; this failing, it resorts to another and perhaps another. Here the relation to the result is more definite. The failure of the effort in one form inhibits it in that form, but the effort persisting discharges itself in another. The operation of the result comes about, we may say, *ex post facto*. It does come about, however, if only by a method of exhaustion.

Taking another short step we may regard the growing satisfaction or even a perceptible approach to the satisfying object as fortifying the effort in the direction which is in fact going to succeed, and we then have the results of the effort as they accrue reacting upon it. At the same time any turn arresting the incipient satisfaction would inhibit that particular movement of the effort, so that the correspondence of the effort to the line of possible satisfaction is drawn closer. This brings us to the combination of many elements of perception and effort in a unique whole which we took as the achievement of sensori-motor action in the special sense which we give to that term. In that form of action we see that the whole perceptual complex (the individual combination of the moment) acts upon constituent processes of effort so that perceived relations of racquet and ball or of self and prey determine details of action in a manner tending to satisfaction. We must not say that the tendencies of the action are perceived, for without ideas one does not perceive what is not yet there. But the actual changes of relation are perceived, and between this and their tendencies there is a very narrow line and one which is changing continuously. In cases, therefore, where perception gives us a changing system of data moving as a whole to or away from the satisfying result, perception of such changes may, within its limits, fulfil the same function as ideas of their further tendency; and if such perception guides effort we may say that the determinant is conformity, not indeed with an ideal system, but with a perceptual system in which approach to the satisfying result confirms and departure inhibits. It is true that the result can only be the object of an idea and that approaches to it can only be defined as such by judgment. But suppose, *e.g.* that the immediate condition of satisfaction is to be in a certain relation to a certain object at a certain time, then all the changing relations to the object are a matter of perception; and if approximation to the object satisfies and departure from it inhibits, we have the requisites for determination of each act by changes in the perceptual position of the whole. Thus we have effort engendering grasp of and close attention to a complex perceptual system which determines its detailed behaviour—a result closely comparable to that of purpose but without ideas. But we must not ignore the point that the attachment of satisfaction to the perception of approach and of dissatisfaction to departure must be predetermined, and it takes a further step to bring this attachment within the scope of consciousness and criticism. Before we pass to this step observe that in instinct we have whole courses of action determined by the necessity of satisfying instinct at each stage in which, besides reflex and lower forms of conation, sensori-motor activity is involved. In instinct there is this further point of predetermination, introducing the mechanical element: that its structure must be so arranged that the gratification of each phase produces appropriate conditions for the initiation and the successful achievement of the next (a concatenation which is certainly not thought out in the instinctive phase).

5. We must now consider the effects of past experience upon sensori-motor activity and, generally, on the response to present stimulus. In its lowest form we saw that this experience embodied itself in the tendency of the excitement produced by a stimulus to take the character of excitements previously attendant on response to similar stimuli. The stimulus, we saw, acquired a meaning, which is the element of an idea, but not yet an idea free from the stimulus provoking it. In the most elementary case the type of response giving unpleasant results was inhibited and that giving more satisfactory results encouraged. Here the tendency of a response is more distinctly operative; yet it is still rather the tendency as it operated in the past in a similar case than the tendency of this response as the object of a judgment formed

now. If, however, we go back to sensori-motor action and consider it as operating in a mind in which perceptions have acquired these quasi-ideal meanings, we shall see that the difficulty which we had above in keeping strictly to perceived relations is removed, for the perception is now charged with a meaning which carries beyond the present. Thus, *e.g.* approach to the object means now the oncoming delight of seizing it, and we need not look to heredity but to experience for its correlation with gratifying feeling and confirmatory effort. We can now say that perceptions operate through their tendential suggestions. It remains only to distinguish the tendency from the perception as an object of reference on its own account, and we have the explicit idea and the purposive system as already analysed.

Thus below explicit purpose there are several grades of conational adjustment, and in the very lowest there is a significant departure from the mechanical type in the form of sustained and varied effort. Conation, we infer, has at least the germ of purpose in it. It is the operation of mind, and when we are contrasting the teleological and the mechanical in general terms it must be held to fall on the teleological side of the parting line.

In its simplest forms conation is traceable to very low orders of organic life. Hence it is at least a tenable hypothesis that life itself depends on conation in its simplest forms. If that is so its moment to moment adjustments are governed simply by the continuous effort to maintain the balance which is its normal being (*in suo esse perseverari*). Every departure from this balance stimulates a compensatory effort, and it may be supplementary efforts if the first fails. Effort is persistent and varied, just as in manifest conation, and it may even be that if the whole structure is distorted the organism, still clinging to life, is forced into a new orientation. It still holds as long and as well as it can to the line of self-preservation. The object of the conation is here narrowly limited to the bare preservation of the existing system or something as near to it as may be; the means are only those which the system proffers, or if anything new appears it is the blind result of the impact of the effort on disturbing forces. Yet there does appear that persistence in direction with variation of detail-process which is the mark of conational activity. Response is still seen to be conditioned by its tendencies, though there is presumably neither the idea nor even that fragmentary perception of their tendencies which belong to true purposive or sensori-motor action.

We might bring this hypothesis to a definite test if we could be sure of the precise limits of adaptability in mechanism. It is possible to invent mechanical devices which provide for variations from a norm and for persistence in a certain course or on a certain balance despite disturbing forces. Is it possible to provide for that kind of general self-adaptation and its more remarkable phenomena such as self-repair which, within limits, are characteristic of every organism? Short of the question of possibility, is that of probability. To those to whom mechanical causation appears the normal course of things, the notion of a departure in the case of organic life seems contrary to the rational interpretation of experience, and something that they could only accept on overwhelming specific evidence as one might a miracle. Those who recognise conational activity in the form of purpose as a verifiable mode of causation, radically opposed to the mechanical, are quite prepared to find less developed forms of this activity in organic life, and would rather be surprised if no such form should appear. To them the most obvious and intelligible interpretation of organic adaptability runs on conational lines, and they put the burden of proof on the opposite side. The decision must be found in the further development of physiological knowledge, a development which will be forwarded if prejudice in favour of one type of causation over another is discarded. For our present purposes we must be content with viewing the conational interpretation as the more probable. Provisionally, that is to say, we range those modes of behaviour which to the observer differentiate the behaviour of living from inanimate things, as due to an element of that conational activity in which we find the basis of purpose.[1]

6. *The Psychophysical Whole.*

For the behaviour of the living organism there are, in fact, three possible explanations. The first conceives it as a mechanism adjusted by a supernatural intelligence to respond to its environment in accordance with its needs. This endowment is to explain all the lower forms of animal behaviour, all that we have hinted at under the phrase 'organic adaptability,' together with reflex actions and probably 'instinct.' In addition, the same higher intelligence has endowed the human animal with a soul, and the higher brutes with a certain undefined measure of intelligence, to which their more distinctively purposive actions may be referred. Towards this soul or this intelligence the bodily instrument stands in the relation of a mechanism. It is not part of the mind, nor the mind part of it, but the two act and react. So far there is a clear-cut distinction, not so much between the teleological and the mechanical as between mind and matter. Matter never serves a purpose except when wrought into a systematic arrangement by a mind external to it, be the mind finite or infinite. So far the first view, from which we note that all that is not clearly purposive is clearly mechanical. The second view agrees that the basis of animal behaviour is a mechanism, arranged with greater or less plasticity to respond to the environment in the manner best adapted on the whole to secure the life of the individual, or, more properly, the permanence of the species. But it holds that this arrangement is not truly teleological. It has not been constructed by a supernatural mind, but has grown up through the remarkable combination in the substance or substances known as protoplasm, of the quality of modifiability with that of permanence. In virtue of this quality, protoplasmic tissue, which is strictly continuous from the first germ of life to its latest descendant, is for ever adapting itself in new ways to escape danger and surmount obstacles, and by an indirect but effective process, the steps of which need not be recapitulated here, there grows up a structure, which no mind planned to fit its environment, which no mind shaped to secure its ends, yet which does fit its environment, and thereby does secure its

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[1] In this account the living being is regarded as a system of what must be called forces, in which mechanical relations are qualified by teleological relations. When these two sets of relations are hypostatised as Mind and Body they become two substances, and in place of a system whose mode of action as a whole departs from that of mechanical systems in virtue of its specific quality, we have the problem of interaction between two distinct and separate systems, each with laws of its own. If interaction is admitted, we have the conception of body as a purely mechanical system, whose operations at a certain point come plumply to an end, while at another point they as plumply begin, the intervening stage being filled by actions within the other system. Body is then a purely mechanical system which does not conform to laws which, it is not denied, are adequately proved for mechanical systems. To escape this conclusion it must be admitted that Mind exerts force and is acted on by force. But Mind was precisely the concentrated essence of that which is opposed to force. Thus the contradiction of a purely mechanical system which does not act mechanically is balanced by the contradiction of a non-mechanical system which does act mechanically. To escape from this dilemma the Parallelistic scheme is propounded, according to which the mental and the bodily run on side by side in point to point correspondence, but without interaction. This scheme, however, in effect renders the mental element superfluous. A complication of mechanism is all that is required to explain the actions of living

beings. On the other hand, the rise of the psychical stream in coincidence with a certain point of the physical, and its disappearance at another point, are left unexplained.

In point of fact, the actions of living beings are not explicable in mechanical terms, and we are compelled by the evidence to admit a teleological factor. This we are able to do without contradiction if we avoid hypostatising qualifying aspects or conditions of real process into substances. The concept of the mechanical sums up or brings together certain elements of experience; the concept of Mind certain other elements. But these elements belong to or qualify realities which act as wholes, and may include many more elements which elude not only our observation but any inferences which we can draw from observation. The mechanical and the teleological are then modes in which reality operates. At some points reality appears to operate wholly on mechanical lines. At other points, in living beings, its mechanical operations are qualified by teleological factors. At other points, it may be, it acts in teleological ways exclusively. To avoid misunderstanding it should be added that there is no warrant in this statement for the inference that in the living being either the mechanical or the teleological factor is the 'substance' of which the other is the 'quality.' Both factors qualify the total Reality, which in addition may contain many unknown elements.

ends. Here again then we have a mechanical explanation of at least the lower form of vital activity, and the only doubt is how far the explanation is to extend. If reflex action and instinct, which already show evidences of plasticity, are to be referred to an inherited arrangement of interacting parts, may it not be possible to gather the seemingly intelligent actions into the mechanical fold, and if so, will there be any fathomless gulf between the behaviour of animals and men ? May not teleology itself, lately referred to mind, be simply the appearance presented by a mechanism too complex in its adjustment to details to be grasped in the entirety of its principles ? Should not choice and effort and deliberation and, indeed, consciousness itself be set down as epi-phenomena which, in the inscrutable movement of things, have been evolved, interesting but devoid of function, as the accompaniments of those interactions of nerve-elements which, if we could understand them adequately, we should see to be governed in reality by purely mechanical laws ?

To these questions the third theory offers the following reply. Whatever the cause or origin of the organism, it is in itself not a purely mechanical arrangement of parts. It is neither a machine created by intelligence *ab extra*, nor one built up by unintelligent processes. It is not a pure machine at all, but a whole having a conative principle at work within, operating on and modifying what are otherwise physical, mechanically determined elements, and so fashioning the growth and function of the parts by reference to the requirements of the whole.

Is there a possible logical proof of this theory ? Can we, first, establish it for those organic actions which are accompanied in our consciousness by clear purpose ? Can we justly say that the purpose causes the action ? The reply is that our analysis of purpose has justified the application of the inductive test that has been briefly referred to. It shows that the question whether an act is purposive must be answered affirmatively if it is proved to depend on a judgment of its tendency to yield certain results. *A fortiori* an act is purposive if (as will happen if the judgment is rationally founded on real tendencies) it is truly conditioned by its actual tendencies to the result. Now comparative observation, both of our own purposes and of many actions of other human beings and even of animals, shows that in many cases action varies in accordance with this tendency and in relation to no other observable existent condition. Such action, therefore, must be purposive, unless there be some condition present in each case which we cannot observe, and this condition must (to exclude the alternative of teleology) be a collocation of forces acting mechanically. But a mechanism which can hold its direction by novel variations and unique combinations of processes differs radically from any mechanism that we know, the condition of a mechanism being that it responds in a typical way to typical conditions. It is true that a machine may achieve unique adaptations to individual cases falling under a general rule. Thus in the linotype the spaces between the words are made by wedges, which are driven home by a single thrust, and owing to their shape go just far enough to fill the line. No two consecutive lines will, unless by rare accident, require precisely the same spacing, but the plan of thrusting in wedges secures the true fitting, differing in each case yet equally adapted to the end. The combination, however, though differing from case to case, is the same in principle. It is quite another matter when the principle of combination differs from one instance to another. In a simple purposive action, such as that which we first took as an illustration of purpose, where I require a book which I remember to have left in a particular place and go to fetch it, my memory, which, mechanically interpreted, must be some deposit of the effect of my previous dealing with the book in my brain, is so combined with my need and my physical surroundings as to discharge in succession the actions appropriate to fetching the book. This deposit—complex enough in that it must have its exact point to point correspondences with the several physical relations of the rooms of the house, etc.—is only one among the millions of deposits that my experience has formed. Yet provision must be made for selecting it out of them, combining it, if necessary, with other relevant memory-deposits, and bringing them and no others to bear upon the physical tension, which may be supposed to correspond to my felt need, thereby effecting the successive discharges of a complex series of actions. If we try to formulate a general plan for effecting such selection and correlation, we find ourselves speaking of a state of want, picking out from experience whatever is relevant to its satisfaction, and guiding action accordingly. Conceivably we might find terms other than these which would avoid all reference to feeling or consciousness, but they would always imply a something determined in its actions by their relation to their results, *i.e.* something purposive. Abstract the notion of the relevancy of means to end, and the bottom of the whole proceeding tumbles out. In short, in the activity which we claim as purposive, we find repeatedly that one factor of our life (*e.g.* an experience) may be brought to bear upon another (*e.g.* a want) in a manner that varies indefinitely from case to case. The only principle uniting the otherwise unique combinations is that of the relevance of the combination to the end. Admit this principle, and we recognise a structure determined by purpose. Deny it, and we have no general plan to explain the unique combinations. Either horn of the dilemma excludes mechanism.

The denial of purposive causation, therefore, is not suggested but repelled by general experience, and owes its existence only to the theory that everything must act by mechanical laws. But this theory is a pure assumption, which derives its apparent cogency from confusion with the quite different principle that everything must act in accordance with some law. The leading mechanical principles I take to be adequately proved for mechanism, and, therefore, for any structure which is purely mechanical. Now the organism is a physical structure, but to assume that all its actions conform to mechanical laws is to assume that it is a physical structure only. Consciousness directly informs us that it is more than this—that it is what we called in Part I. Chapter II., a psycho-physical whole. How far the psychical elements in it, which our account has led us to conceive as activities constantly correlating the actions of its different parts, actually cause the reaction of these parts to diverge from the line that they would follow in accordance with purely mechanical laws, is a question which is to be settled entirely without prejudice by inductive argument. This argument shows, in fact, that psycho-physical wholes differ in their behaviour from purely physical systems in direct proportion to the development of the psychical element within them. As against the obvious inference from this argument, the mechanical view can only maintain the bare possibility that there might be a mechanism so constructed as to yield all the varying adaptations of the living being. This is a consideration to which, in view of the radically different character of known machines, very little weight would attach, but for the difficulty of the supposed breach of continuity involved in purposive action. But there is no breach of continuity. Purposive activity, *i.e.* the conditioning of the action of each part of a system by the causal tendency of the configuration as a whole, is the characteristic mode of reaction of certain structures—those which we call psycho-physical. *Qua* physical this structure tends to act in accordance with mechanical laws, but this action is modified by the condition mentioned, which is the psychical element of the whole in operation. If a body impinges on an arrangement of objects in a field of magnetic force, there will be a rearrangement of those objects in which the direct effects of the impact will be compounded with the governing conditions of the magnetic tension. When one element of the nervous system is affected by an external force, there will be a redistribution of the molecules within the system, regulated by the tensions of the system. Only these tensions are of a peculiar character. They bring to bear on the action of each element not only the existing condition of the whole, but its moving processes, what it has in it to become or bring about, its causal tendency. Such a tension is teleological, not mechanical, but it furthers, corrects or guides the motions of physical elements in the system to which it belongs, just as the magnetic or any other mechanical tension might do. Moreover, on its psychical as on its physical side the psycho-physical whole grows out of its antecedents just as any other configuration, only that in the action of its antecedents, the teleological condition will always have been operating. There is then no breach of continuity in teleological action, though there is involved the operation of conditions which are not those of a purely mechanical system.[1]

7. *Summary of the last two chapters.*

We set out at the beginning of the last chapter with a distinction between the cause and the purpose of a thing as two forms of explanation which could be sought of its existence, genesis and behaviour. How far has our analysis justified this initial assumption, and what forms of explanation, that is of the complete interrelation of facts, have appeared in the course of it? Let us summarise our principal results. We started with the case of a part of a machine, and we pointed out that if we enquire into the cause of its existence or of any one of its actions we are referring to past events in which we have to select the elements which are relevant, and we discover that such elements, continuing, combining, dividing and recombining in various ways constitute a process in which at a certain stage our object is an incident. We refer it then to a continuum of becoming, in which we sort out the operations which follow uniformly on one another from variable accompaniments. In this procedure, moreover, if we come upon any relation of temporal antecedent and consequent which we believe to be universal, if, *e.g.*, we are satisfied that a piston makes a particular stroke because there is pressure of vapour behind it and none in front of it, we are not content with this result, which only gives us the 'cause' in the particular case. We require laws of general application, and therefore of an abstract kind, which would hold not only for this particular piston but for anything moved by the pressure of any sort of vapour and against resistances of all sorts and kinds. We are thus led, *e.g.*, into the examination of relations of pressure, temperature and volume in all sorts of gases and into the conditions of acceleration in all sorts of physical collocations, and we seek in fine for a universal formula stating relations between variables in such wise that when we can measure the actual value in a given case of one variable, the value of another may be calculated by bringing it under the formula. If, lastly, we have satisfied ourselves of the validity of any one such formula, our ideal is to exhibit it in turn as a case falling under a still wider law, and so to proceed until we have an irreducible universal law or system of laws applicable to all conjunctions of things and yielding quantitatively exact results when applied to any given conjunction. This, then, is one line of explanatory analysis. It consists in getting down to the elementary relations which hold universally in all processes in whatever way the elements may be combined. It connects any given incident with the scheme of reality at large by exhibiting it as one instance of relations holding universally throughout Reality.

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[1] It may be argued that the structure must have come into being mechanically—by the physical laws of heredity, and that accordingly at whatever point it first begins to be determined in behaviour by relation to the future, at that point and in that respect there arises something which was not in the cause. But the initial assumption begs the question. As a fact we know of no origin for life except antecedent life. And if life is as such conative then the conational, *i.e.* psychical, element, is permanent. What the argument from continuity does prove is this: elements which are as such mechanical can only form mechanical combinations. For though in combination they affect one another, yet by hypothesis they can only do so mechanically, and the action of the combination is nothing but the resultant action of mechanical elements. Hence, (1) if the psychical is qualitatively different from the mechanical it cannot arise from purely mechanical elements. Thus if true conational activity exists at all the mind on which it depends, or at lowest the assumed distinctive elements of mind, whatever their origin, are not born of the mechanical elements. Alternatively, (2) the mechanical and psychical are not the absolutely separate elements which the argument suggests, but are qualitatively different factors or aspects in one reality, and alike original factors. We recur to the subject in Chapter IX., p. 442 *et seq.*

In applying this scheme of explanation to the particular case we have always at some point to take a conjunction of elements as so much hard fact. The concrete fact (the existence of this particular piston, sound and true to its cylinder, the particular stroke that it makes, etc.) has its explanation in a prior concrete fact. The piston was fixed, at a certain moment steam was admitted or an internal combustion took place. There was a prior concrete situation out of which our fact emerged. True, it emerged in accordance with rigidly universal laws, but these laws state, not the necessity of the combination, but, given the combination, of its result, and if in turn we apply the same laws in tracing the genesis of the combination (the P^1 generation if we may adapt the expression used in genetics and count backwards), we find ourselves in the same position. The P^2 generation is still a combination which we must take as fact not explicable by the general laws, though explaining through them how, given the combination, the P^1 generation comes about. On this line of enquiry, while we can always hope to explain a particular fact as the outcome of some combination of data, in accordance with universal laws, we do not explain the combination itself. We can only trace it to an anterior combination, about which the same question will arise. In such combinations there is no principle of union, and we may distinguish them as collocations.

We found, however, that grounds of combination could be discovered, and that on three lines. One part of the combination might be the ground of other parts. If it is the complete ground acting mechanically this would imply solidarity; otherwise it is a partial ground, the residual conditions being supplied by collocations. For these there are no mechanical grounds. Secondly, the parts of the whole might themselves be dependent on the whole, *i.e.*, their differentiation and maintenance is grounded in their mutual requirements. This is the organic principle and admits of any variations of character and mutual relationship compatible with the maintenance of the organic parts in the whole. So far, however, as it operates without purpose, the organism is limited in its adaptations, and therefore in its actions on the environment, to the satisfaction of immediate needs, and in the main outlines of its life it rests on structural principles which for the individual are determined from its birth. If we ask how such structures have arisen and exclude purpose from our purview, we have to contemplate a vast network of collocations in which the organism must maintain and adapt itself. Among these the internal forces play an essential but not a dominating part. The species is largely at the mercy of circumstances.

Thus neither the mechanical nor the organic principle offers a ground of combination of elements quite independent of one another, or so far as independent of one another, *i.e.* of collocation in general, the mass of changes which include the formation and break-up of structures, the occasional relationships of things easily separable, in a word, the flux of concrete Reality. For this we must look to some factor which can bring the elements into relations of which, apart from it, they are quite independent, thus building up a system which determines their place, and yet is itself conditioned by the results of the system as a whole. Such a factor and such a system we have found in purpose, and we have shown (*a*) that purpose is a genuine cause, and (*b*) that it brings about events and places things in systematic order, creates structures, modifies them and so forth, in such ways that each event or each thing is determined in place and time and even in its existence by relation to the system which it helps to institute, while (*c*) it is itself conditioned by the system which it creates. The purposive system thus contains a ground of correlation of the most independent things.

In purposes as we know them, however, elements of contingency remain. In some, *e.g.* the making of a machine, the purposive agent is quite external to the materials that he uses. The man cannot make his machine out of nothing, or anything, but only of definite things, and they have their history as he has his. In other relations this externality diminishes. The human purpose arises and develops as a factor in the organism in relation to the rest, and in much of its work it may be said to formulate or bring together the needs of the organism as a whole and particularly its remoter needs, while parts of the organism—the sense organs and the limbs—are the primary instruments which it uses. To this extent purpose appears as the factor in an organic system which so correlates the parts as to secure the ends necessary to maintenance. Conversely, though, as we have seen, the organism may adapt itself to passing events without the aid of purpose proper, its range of adaptation on such conditions is necessarily short, and the larger adaptation necessary to the full development of organic life requires purpose. Thus purpose develops the organic principle, and we may at least imagine a system in which the purposive factor should condition and be conditioned by the remaining elements having as its end the maintenance and completion of their harmonious co-operation.

We have then considered three principles of explanation for the variations of concrete Reality. Two of these, mechanical and organic, offer grounds of combination within a limited range and cannot be applied to collocations; the third or purposive can supply a ground for collocations and so for combinations in general, but its operation generally implies the existence of unconnected factors. This criticism does not altogether apply where the purpose is a factor in the organic system, but in so far as the purpose combines elements which without it are mutually indifferent it would be a contradiction to suppose that it springs from the elements. They may in some way condition it, and it may in some way condition them. But neither is the sufficient ground of the other. We shall consider this relationship further in the next two chapters in the course of an enquiry into the possibility of using one or other of the three principles here distinguished as the basis of a system which might be conceived as applicable to the whole of things.

CHAPTER VIII

REALITY AS A SYSTEM

1. We have found in experience three types of system. Two of these, the mechanical and the teleological, involve fundamentally opposed forms of causal process. The third, the organic, does not appear to involve a distinctive type of causation. Its processes may be either mechanical or teleological or both—in its fullest development certainly both. Further, in our experience the teleological process appears as always centred in an organism. Thus the teleological seems to be in some way dependent on the organic, but at the same time necessary to its full development. This point will come up for further examination in the course of the enquiry for which we are now prepared. We have thought of all Reality as forming a System, and we have now to ask whether it is possible in the present state of our knowledge to form any conception of the general character of this System. Does it conform to any of the types distinguished, or must it be of a quite different order? Any conformity can hardly be exact, for all the mechanisms, organisms and purposes of our experience are partial and must be affected by that fact. But it is possible that with the modifications arising from this difference they should be applicable to the Whole, and the possibility is at least worth exploration.

What data have we for our enquiry? We see mechanical and teleological processes at work; we know of organisms and their growth; the synthesis of experience indicates the gradual expansion of the organic and the teleological. But the synthesis failed to clear up the relation of these principles to Reality as a whole, and it was for this reason that we first began to look for some other instrument of enquiry.

But apart from the interrogation of experience, what instrument have we? If the term interrogation be taken in the widest sense, we may safely reply none at all. But for this purpose interrogation must be taken to include not only the results which experience demonstrates, but any truths implied in the process of demonstration. What on the surface we call a sound generalisation from experience is not, of course, a truth which merely sums up in a single formula a set of observed facts. It states a connection as holding generally, and if it is thoroughly scientific, universally; that is to say, as holding not only for certain things that we have observed, but for others that we may observe or that may never fall within the sphere of our own experience at all. Hence the scientific use of experience is a process which goes beyond observed and recorded facts, by using them as bases for inferences. Suppose that we can analyse this usage, and write down certain propositions which, if true, justify it, and, if false, destroy it. These propositions must then be regarded as the tacit assumption of the scientific use of experience. If they are true, the results of science are trustworthy, and if not, not. That being so, it is clear that whatever validity attaches to the results of science, whatever confidence we can legitimately place in its generalisations, must attach equally to these assumptions. Now it is open to thinkers to question whether science itself is valid, and if the answer be in the negative, this argument for the validity of its assumptions falls with the structure of science itself. I do not propose here to add anything to that which has been already said on the ultimate ground of rational thought, but assuming for present purposes the general validity of the scientific method of enquiry, I propose to review some of the principles of Method distinguished above and to see what light they throw on the problem before us.

2. I would recall first that the impulse of rational thought stated generally is to weave its experiences into

a systematic whole. The isolated unconnected experience is as it stands non-rational. It requires to be connected with some further experience as its ground. Now we saw that if we conceive the ground as altogether outside the consequent and proceed to ask of it in turn what is its ground, we have always at some point to content ourselves with a mere datum for which no ground can be assigned. The ideal of finding a connection for everything in experience is on these lines a self-defeating infinite regress. This led us to conceive the ideal of thought as a system of mutually necessary parts, each grounded on the system of which it is one condition. In such a system there is no need for any extrinsic reference, but as long as any such system is but a part of reality (and the totality of experience is but a part of reality) the question of its ground in the remainder arises. This question, however, would be solved on the same lines, and we arrived in consequence at the ideal of reason as a system of the real, conditioning and conditioned by each of its parts. We did not consider that it could be inferred without more ado that reality must conform to this ideal, but we held that as an expression of the goal of thought it must be regarded as the Rational Hypothesis. If reality is intelligible, it must be thought to be a system of this kind, a system founded on mutual necessity.

Now we have seen that the attempt to conceive reality as a whole in any form whatever encounters all the difficulties derived from the idea of the infinite. We have dealt with these difficulties and decided that they were not insuperable. As a hypothesis the conception of reality as an intelligible whole remains open to us. But there is a further difficulty. In such a whole, for every part, the ground given is a system which extends beyond it. But of the Whole as a whole no such explanation can be given. Assuming that reason could achieve its ideal and form things into a whole, it could give no further account of the whole that it has formed. At first sight this alone appears as self-contradiction or self-defeat in the work of Reason. Everything needs a reason to account for it, but of the whole of things no rational account can be given.

But this is going too fast. It may be replied that as *ex vi termini* a whole differs from a part, the rational account of a whole is something different from the rational account of a part. The only reason that can be sought for the whole of things must be an inherent reason. The part may, and in a measure must, have its reason outside itself. The whole of things cannot have anything outside of it. Its reason is something in its own nature.

3. This result has an important bearing on the applicability of mechanical, teleological or organic conceptions to the whole. In the first place it is clear that mechanical explanation will not supply us with any inherent reason for the existence of any whole involving variable relations, for it always refers us to something beyond the effect to be explained. Let us see whether we fare any better with the alternative of teleology and the conceptions of Value and Purpose. Value as attaching to a means of course refers us at once to an end, but there may be, and for us there apparently are, objects valuable on their own account, experiences intrinsically enjoyable, good apart from their effects in themselves. If we are satisfied that anything is thus valuable in itself we do not ask for any further reason why we should seek it. Its reason is in itself. But if we think of the possibility of applying any such intrinsic reason to the system of Reality we are faced at once by the fact that the experience to which we have been appealing is that of a mind and its purpose. There may be good things like the beauties of nature which come about by no purposive effort, but the only cause that we definitely know of the existence of valuable things is some mind like our own, and we shall find it hard even to attribute any meaning to value other than its appreciation by, or at lowest its bearing on some mind. If, then, we sought to make the value of reality its inherent reason we should, if we worked from our experience, be committed to conceiving it as the work of Mind, and as created because it is good. There are here a formal contradiction and a very substantial difficulty. The formal contradiction is that the ground of reality proffered as inherent is in fact put

outside it in the creative mind. This is perhaps less fatal than appears. To save ourselves we should have to bring the creative mind within the system of the Real, and conceive reality after the fashion of idealist philosophy as mind objectifying itself or realising itself in an objective world of its own creation. We then have the kind of mutual implication that we require, the objective world postulating mind as its condition, the mind unable to realise itself except in an objective order. But here the substantial difficulty arises. The world thus freely engendered by mind, *i.e.* without any limiting condition other than the nature of mind itself, should be wholly satisfactory to mind. Reality should be perfect. But if this is so, perfection loses all meaning, and the value which we attribute to the whole of things is so discrepant from what we recognise as value that all use of the term becomes misleading. It has brought us only to the edge of the gulf where the piety of optimism disappears into a whirl of unmeaning words.

If we are to retain the conceptions of value and purpose at all, it must be under quite other conditions. Our mistake has been that starting with the conception of value as an inherent ground of reality we have identified it, in conjunction with the mind that engenders it, with reality as a whole. If there were not contradiction in this there would be something like tautology, and even if we avoid conflict with manifest facts we shall not attain explanation on such lines. Let us go back to the problem as we first formulated it. We were to find a system in which every element is conditioned by every other. Now there might be an element of value in such a system, and this element might even be a principle running through the whole and one condition of every other element. But as an element, as something which whatever it be is less than the whole, it must itself be conditioned; and if it is in fact something that helps us to an understanding of reality by interrelating its elements, we may conceive it as conditioned by the very material on which it works. The relation on this view, then, is mutual. Though the structure of reality exists because it has value, every element that goes to build it up is on its side, so far as it goes, a condition of the structure, and, therefore, of the value secured by it. The contribution of each element is certainly a condition of its existence in the structure of things, but its own inherent nature is in turn a condition of the structure, and, therefore, of the value which that structure possesses. Such conditions are a very serious limitation of the value of the whole, for they must account for collision, strife and destruction within it. It is clear then that value is not the sole principle governing the real; it can at best be only a condition within the real. It may be a principle of structure conditioning every element that enters into such structure, but the structure is not less conditioned by every such element.

The point may become clearer if we retranslate value into purpose, and so come to think of mind not as an unconditioned creator but as an essential element conditioning and conditioned in the fabric of reality. In our experience mind animated by purpose operates on surrounding conditions to secure the thing of value. To the surrounding conditions we ought to add those which go to make up and determine the nature of the purposing mind itself, to give it its bent and tendency. Under these conditions we get a process which is in a measure, but only in a measure, self-determining. In proportion as the purpose dominates it, that is to say, every element concerned is brought into being for the sake of what it effects, and its relation to the outcome is a condition of the effort. The purpose animating mind is, as it were, the germ out of which the whole organised system of action grows, and it grows by bringing within its tissue conditions necessary to its end. But it is also at every point limited by the degree in which these conditions are malleable, and the final character of its end must even accommodate itself to these. The conditions determine the end every whit as much as they are determined by it, and at bottom this is true, not only of the instruments with which the purposive intelligence acts, but of the conditions which determine the character and activity of the mind itself, which indeed are responsible for the initial fact, that this or that specific purpose is formed. Furthermore, in the purposes of experience there are always conditions external to the purposive system and indifferent to it until shaped and arranged by the mind. Thus the purposive process is never wholly self-determining.

4. Now, if we seek to apply this model to Reality as a whole, the first steps are sufficiently clear. We have to conceive a mind operating on conditions under the inspiration of an idea and shaping the course of things to the final realisation of that idea. The difficulty arises when we contemplate the relation of the mind to the conditions operated upon. Our model suggests that in the beginning of things the Spirit moves upon the face of the waters of chaos, evolving out of them an ordered world. But this would be the most uncompromising dualism, at the opposite pole to that systematic interconnection of all parts which we are exploring. If we are to find any such interconnection we must bring the two sides into closer relationship ; we must either think of the material as itself conditioned by the purpose or of the purpose as conditioned by the material, or of each as at once conditioning and conditioned by the other. If we explore the first possibility we observe in passing that we are departing from our model, the partial purposes of our experience ; but, without staying to ask whether this might not in the circumstances be legitimate, we must consider closely the consequences of the departure. The suggestion involves that whatever exists, exists because it has some value in a purposive scheme. Is this value, then, the whole and sole ground of its existence ? If so, the scheme must be perfect, for there can be nothing at any point to resist the one comprehensive purpose. Whence then disorder and conflict, and what of all the evidence of the indifference of parts to the actual structures into which they enter. If we do not believe that Reality is perfect we cannot represent it as the expression of a single purposive principle, freely determining the character and position of every part by its function in the comprehensive unitary scheme. If any such principle is the implication of

interconnection, any such conception must be abandoned. Can we then turn the relation round and suppose the purposive principle to grow out of the elements? But if so we must ask how it is that the elements are uniformly such as to combine into a unitary scheme. If there is anything undetermined by its relation to the whole, how explain its conformity to the whole? We are driven back upon some organic principle anterior to purpose and indeed enabling us to dispense with purpose, but raising in fact just the same question of its relation to the elements which it organises as was raised by the conception of purpose. Does it radically condition all the elements, *i.e.* determine their character and position in entirety? If so, Reality is a perfect organism once again, and yet not something congruous with the organisms of our experience in which the parts always have a certain distinctness of being and characteristic activity. If we reject these results we are driven back on mutual determination, which implies that each part has a certain character of its own, through which it makes a contribution to the whole, but yet is conditioned by the others, each of which has the same dual constitution. This brings us to something like the organic systems of experience, and we must ask whether Reality as a whole could be organic in accordance with this definition.

5. We have conceived an organism as a system whose parts, while possessed each of its distinct character and activity, yet maintain one another because conditioned by one another's requirements. But if we think of this condition as governing the whole action of each part in Reality we are back again at the perfect harmony which we have repudiated, ignoring all the conflicts and all the evidence of mechanical indifference of parts to the structures into which they enter. It might be pleaded that there are ultimate elements which are conserved, and that these, if mutually necessary, must be regarded as constituting a harmony; but what we are considering is not merely what ultimate elements may be thought to exist in Reality but what structure they form, and why.

If we are to grant this structure as a simple expression of the mutual necessity of the elements, that would give us a perfect organism in which conflict would be unintelligible. We have to admit a factor of antagonism or, at lowest, of indifference, balancing the factor of mutual relationship. We have to think of the harmonising principle not as dominating the elements through and through and so determining their every act: indeed, this would, if we consider it fully, end by abolishing their distinction. We have to think of it as touching them at a certain point, limiting, conditioning them in some respects, but leaving them activity of their own which, within the conditions, is regardless of everything else. We have, to use a mechanical metaphor, to think of the structure of the real not as though it were a wall in which every brick on every side and along the whole surface of every side and at every angle at once determines and is determined by its neighbours; we have to think rather of the parts as each pivoted on a point about which they have free movement. The restriction is such that they cannot destroy one another, but if an unskilful person sets them going there will be many collisions and blockages, and it is only by learning all their relations that he will gradually get them to work together to some joint result.

We must then frankly admit a certain dualism and a certain pluralism within our organic conception. We have elements indefinitely numerous, and they have each a factor of self-determination and a condition of systematic inter-dependence. Omit any of these distinctions and the organism either collapses in the indistinguishable unity of the atom or is idealised into the harmony of perfect health and happiness. We cannot claim this ideality for the real, yet its organic unity is not an empty conception; it is a recognition of multiplicity and a denial of the unconditioned; it has elements independent in that none is to be resolved away into others, yet each conditioned by the totality to which it belongs. Indeed, the very independence of the part lies in the fact that it contributes to the totality which conditions it. Again, the system has principles which are opposed and not to be resolved into anything simpler and common to both, but the principles are such as to play complementary parts in a single system, and it is from the nature of the system that they are inferred, and as functions within the system that they are intelligible.

If then we ask whether it is possible to present Reality as the expression of a single principle determining the character and position of every part by its function in a comprehensive unitary scheme, the answer must be in the negative. If we ask whether it can be a system into which every part fits accurately of its own nature and without necessity of adjustment, the answer is again, no. The only sense in which an organic concept may be used in application to Reality is that it is a whole of parts each conditioning and conditioned by the rest. The mutual relationship implies that in each part there is ultimately a factor of self-maintenance or self-expression which yet is conditioned by relation to the whole. Thus a principle of unity embraces all elements, not in such a way as to destroy their distinct being and original contributions to the whole, but only in such way as to condition them. With these reservations it is open to us to describe Reality as an organic system. We may say that the conception is neither monistic in the sense of tracing everything to a single principle, nor pluralistic in the sense of resolving Reality into wholly independent elements, but organic as conceiving of elements of distinct being but mutually conditioned.[1]

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[1] The use of the term is of course analogical and only legitimate with a serious proviso. Mutual conditioning has two opposed aspects. On the one hand two things are necessary to one another ; on the other hand they limit, restrain and even conflict with one another. In the healthy organism of our experience which yields our notion of the type we think of the mutual necessity. Through anterior evolution the parts have come to be such as spontaneously serve the whole. Hence we think of the organism as a harmony and define it in terms of mutual requirement. We tend to forget the full implication of the term 'mutual,' which is that the part in its way conditions and limits the whole as much as the whole the part. This becomes apparent in the organism in disease. But we conserve our ideal by treating this as an imperfection in the organic system. In reality it is an imperfection in respect of harmony in the mutual relations of parts. Each part has, so to say, its own hard

In defining the organic concept we have travelled a long way from the idea of purpose from which we started, but before we make up our minds that the organic principle either excludes or is indifferent to the element of Purpose, there are two considerations to be weighed. The nature of the System, with its pair of contrary but complementary principles, must be further analysed. This will be attempted in the following chapter. And the bearing of the organic principle on genesis and development must be considered. To this we shall now proceed.

6. We have been moving in this chapter on the assumption of what above (Part II. Chapter II.) we described as the rational hypothesis. We are conceiving in the first place a fabric of knowledge, so compact that it stands as a single truth, and so fully articulated that every fragment fits into the system with precision, as a condition of the whole and conditioned by the whole. We have been assuming secondly that this ideal, though of course far from realisation, indicates the true nature of Reality as it would be revealed if fully understood, that is to say, we have been assuming that Reality, too, is a system in which each part is conditioned by the whole and the whole is conditioned not by anything outside itself, which does not exist, but by each and every element in their mutual relations. This assumption is exposed to criticisms which we shall presently consider, but our business for the moment is to draw out its consequences.

core of self-assertion, and it is an uncovenanted mercy, if this self-assertion accords with the requirements of the rest, or rather it is a mercy covenanted by the long process of evolution. Now, in applying the ideal of mutual conditioning to reality as a whole, we have no anterior development to look to, and we have to take account of all the evidence of mechanical indifference in the world. We do not start with a harmony. Here we must stress both sides of mutual determination alike. Again, the living organism is situated in an environment in which it would be destroyed if its parts should fail to co-operate. The whole is not so conditioned and is not destroyed by any disharmony short of incompatibility of its elements. Hence the limitation on change which we predicated of organisms above (Chapter VII., pp. 410 ff.) loses most of its force. It must always be doubtful whether any conception derived from parts should be applied to a whole, but with the qualifications explained the analogy may, I think, stand in this case.

Now the essence of such a system has been seen to be that there should be contained within it nothing unconditioned. If then we seek to trace back the genesis of things within it on mechanical principles to an initial cause, we are at once confronted by two alternatives: either we must take this cause, a mere part of our system[1] as an unconditioned datum, or we must go beyond the system to an anterior existence. In either case the system fails to realise its pretensions. It follows that in a complete system any point that we start from as the cause of what follows must itself be conditioned by what follows, which is possible only if its inherent tendency to bring about the resulting process is a condition of its own existence, that is to say, it must be purposive, and we are brought back to the same conception of purpose as at once conditioning and conditioned which was reached in our first account of Value. But the result to which we are now brought is this, that if Reality, which includes process, is an organic system, its initiation, being explained from within, involves a teleological element and is in fact the work of a conditioned purpose. Thus the organic ideal involves a conditioned teleology.

But at this point our whole assumption will be called in question. If Reality involves an infinite process, we shall be asked is it theoretically possible to grasp it as a whole. That first term of our series which had to be conditioned by relation to its own results is in Reality no first term, but arises out of that which went before. There is no first term because time is infinite and the real process cannot be conceived as beginning at some moment in empty time. The process of things must be produced illimitably into the past as into the future, and no complete and self-contained whole can be imagined.

We have partly dealt with this difficulty in Chapter I., where we saw reason to think that the older conception of straight-line infinitude did not express the final truth, but that Reality, though without bounds in space-time, is yet a true whole; and if we ask in what its wholeness consists, it is in general terms just that any one part wherever we take it is conditioned by the remainder. That is to say, it is organic in the sense in which we have used the term. In regard to Time in particular we saw a meaning for the expression in the conception of ultimate Reality, not as something in process but as including all process in itself as a constituent of its being, and as forming one system in which the end would determine the beginning as much as the beginning determines the end. But without committing ourselves to any speculative view of the nature of Time we must observe that if the rational ideal is valid we are on firm ground in conceiving Process as a continuum in which the conditioning is not unilateral. If we cannot posit a beginning which is conditioned by what is to come out of it, we must maintain that taking any section through the total process where we will, not only is the after the consequent of the before but the before is conditioned by relation to the after. Our principle is that every partial reality has a ground, and all that has been or has happened up to now is partial, even though of infinite extension in time. That part must be grounded in the comprehensive system in which past and future alike are determinate and determining factors. This is possible, as was shown above in our examination of purpose, only if a reference to the future is an essential element in the system as realised at any time. Reality is a whole conditioning and conditioned by not one part alone but all its parts. Hence any part is conditioned by relation to the residue.[1]

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[1] It may be said that the true 'cause' is itself the whole of Reality in its beginning. Be it so, but that is only a fragment of Reality as it is through all time.

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[1] A friendly critic remarks at this point that above (Part II. Chap. I.) it is suggested that all Process is an aspect of an unchanging Reality. If that is so, in the ultimate grounds of existents, there is no distinction of past, present and future, and time-reference accordingly fails as a criterion between mechanism and teleology. In that case we fall back on the distinction between conditioning by values and conditioning irrespective of values. On our theory of mutuality everything is resolvable into elements each of which conditions and is conditioned by the entire system which they together constitute. Each element in so far as self-determining conditions the others without respect to harmony, and is accordingly a potential source of disharmony which experience shows to be effectual. But it is grounded in the entire system of which it

7. The conclusion so far is that Reality *may* be conceived as an intelligible whole, and if so it must be of organic character, and as a process organically determined involves a teleological element. But now comes a further criticism. What precisely are the grounds in which we believe that reality *must* be intelligible as a whole? The establishment of such a whole seems certainly to be the ideal of thought. It seems to be implied as the goal which gives direction to the processes of investigation and criticism. Now if anything is so implied in the reasoning process that, if it is true, reasoning is valid, and if it is false, reasoning is invalid, then its certainty is equal to that of any rationally established truth, and with that result, after our previous enquiry into the validity of reasoning, we are content.

But can this be shown of the ideal of thought? We considered the matter briefly above but may add some reflections partly qualifying and partly corroborating our result. A complete system is the ideal of thought, but can we say that its possibility is a principle without which thought cannot work? It is one thing to say that the work of thought is that of systematising, and another to postulate that its work will some day be complete. Provided the principles that it uses in the work of systematising be sound, is it not possible that the work should go on without end, the value lying always in the solid fabric achieved at any given time and in the living impulse to extend it, not in the goal or ideal towards which the impulse appears to move? Perhaps the fable of the treasure digger applies. The gold was not there, but the digging itself produced golden value in the soil. There are features in the history of discovery which suggest an analogous truth in this relation. By patient work we build, but not as we planned. If this is true of the search for the philosopher's stone, may it not be as true of the search for any completeness of understanding?

In substance this was the argument which led us to

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is an element, and this is a relation of harmony, which is value. Thus value is a condition of each element and each element a condition of value.

regard completeness of system as a hypothesis rather than an axiom. We called it the rational hypothesis. Let us look further into the meaning of the term in relation to the actual course of thought. We have spoken of the solid fabric already reared as having intrinsic value, but when we look at the actual structure of knowledge, even of physical science, nay, even under certain aspects of Mathematics itself, this solidity is not so easily to be seen. Everywhere, as we approach the wider and deeper conceptions—conceptions which make up the very tissue of our experience, such conceptions as Space, Time, Number, Matter, Force, Energy, Life, Thought, Consciousness, Morality—we enter a region, not of rocklike stability, but of a fluidity of which the best that we can hope is that it is the fluidity of growth. The advance of experience does not merely add grain after grain to a heap that is accumulated once for all. There is addition, but with addition there is also constant modification, and few, if any, are the truths of which we can say with confidence that they can never be modified. Perhaps there are none even in Arithmetic of which the total interpretation may be regarded as finally and irrevocably fixed. The advance of knowledge is a process of modifying conceptions. But if this is so, what validity, it may well be asked, attaches to the conceptions already formed, and to the thought which engenders them? If rational methods do not yield us truth, what do they yield us whereby we may put confidence in them? The answer is hard to find unless we remember that modification is necessary to growth, and conceive reason, accordingly, as an impulse towards harmony which, however incomplete at any given time, is always moving in the right direction. If this conception be admitted, it becomes intelligible that a method should be valid though its immediate result does not possess final truth. The validity of the method rests in this, that it is essential to the movement towards truth, and the test is that by constantly following such methods we arrive repeatedly at a wider and more thorough harmony, we reach points of view which do not simply negate old ones, but rather absorb them and set them in their place as partial and incomplete elements. But so to conceive knowledge is to conceive it as essentially a growth. The time will come when sacred Ilium, the highest point of view which we can reach or the inmost citadel of our faith in life, will in turn be overcome. Within the Empire of a greater truth it will figure as a detail which we misunderstood while we cherished it. Thus, if our confidence in anything that we can know or believe has reasonable justification, it is not because that thing is known once for all, but because it is a genuine and essential phase in the growing formation of truth.

But if, in the search for logic and for certainty, we are thrown back on growth, the lines of growth assume a fundamental importance. Whatever we know of them becomes the most vital part of our knowledge, and though here, again, we are fully subject to all the old limitations in forming our point of view, yet it remains that the best conception attainable of the movement is necessary to the full formulation of the reasonable and the true as far as we can know them. If the life of rational thought consists in development on certain lines, to say that development can never mature is to threaten the life itself.

Thus the rational hypothesis is not a mere assumption which can be taken up and laid down at pleasure. It is implicit in the whole organisation of our thought, and has the weight of uncontradicted rational impulse behind it. And yet it is not an axiom that can pass without verification, for we can reason without it. The partial satisfaction of the impulse has its value, though complete satisfaction may be for ever unattainable.

8. Now there is a false way of putting this possibility, against which we must be on our guard. 'Let us admit,' the doubter may say, 'that Reason is at bottom the impulse towards the comprehension of Reality as an organic system. Is it not possible that this impulse, valid and valuable within its own limits, is yet applicable only to part of Reality? May there not be an irrational element, essentially inexplicable, irreducible to system, knowable as we know brute facts that are not explained, not intelligible because not in fact conforming

to the conditions of intelligibility? Reality, as far as it is intelligible, would fall within one system, and to discover and understand such a system is the goal of our rational endeavour. On the practical side, to *make* a corresponding whole is the endeavour of the rational in action. But though contained within the real such a system is not all that is real. In part, the real is fundamentally irrational, and that is the source of the ubiquitous limiting conditions which give us so much trouble when we seek to absorb them into our system. Dualism is then a final truth, yet not such a dualism as to impair the validity of the effort of our minds, both practical and speculative, towards unity of system.'

At this point, however, it will be seen that our doubts are attacking not merely the ideals but the principles of reasoning. We took it as our principle that everything that exists has a ground in reality. The principle applies to that which is the ground of other things, and so we might have an order of being completely systematised and interconnected in all its parts, and yet as a whole grounded on something not merely itself. Only if we conceive reality as a whole would this consequence cease to apply, as there would be nothing beyond, and the grounds of the whole must then lie in the coherence of all the parts. Now we have raised the doubt whether reality can be asserted with any confidence to form such a whole. This doubt applies to our exception, not to our rule, to the ideal towards which we work, not to the principle on which we work. If this principle holds good, then there can be no part of reality which is radically out of connection from other parts, nothing which is 'finally irrational' in this sense of the term. And we must go further. Though reality may not form a self-contained whole, it certainly includes many parts, and we may think of it as divided at any point that we choose to take. Thus we conceived it above as a process in which we could take any moment as the dividing line between the past and future. All that falls on one side of this line is part of reality and all that falls on the other side is the rest of reality, and all the rest. This analysis does not postulate the completeness of reality nor any theory of the infinite. We went on to argue that each part, on either side of the line, being a part, must have a ground, and that the ground must involve relations to the other part, that is to say to all the rest, whatever that rest may be. Thus there is a mutual connection, and therewith, as we showed, a teleological element in the phases of the real. And this is proved not by assuming that the real is a self-contained system, but by the principle that every part of the real has grounds relating it to other parts. Mutual connection runs through the real whether it be conceived as a nexus, without beginning or end, ramifying to infinity, or as a system constituting, when all is taken into account, a complete and organic whole.

We shall proceed in the following chapter to check these conclusions by applying the same principle of ground and consequent on a different method, by means of which we hope to throw further light on the relation between the teleological and organic principle.

CHAPTER IX

THE SYSTEMATIC PRINCIPLE

1. The central principle involved in the application of reasoning to experience we saw above to be the Law of the Ground, in accordance with which the entire complexity of nature with all its variety is held to be resolvable into a system of uniform relations. This principle we are constantly able to verify by analytical comparison showing how variation of results is traceable to varying combinations of conditions, while with precisely the same conditions the same results invariably follow. In this manner uniformity is always seen to run through all variety. Yet it cannot escape notice that variation is not really eliminated. Two concrete situations differ. They consist of elements which are in part alike, or we should hardly set out to compare them, but in part different. We 'explain' the difference by exhibiting a difference in the antecedent conditions and then show that from each set of conditions distinct as they are distinct results follow with unexceptionable uniformity. But though this conclusion may be correct and valuable as far as it goes, it is clear that it has not eliminated variation but only thrown it back a step. We have a concrete whole consisting of several elements. It is possible, as shown above,[1] that these elements imply one another like the parts of an organism, *i.e.* that they are never found in just the same form when separated or in any different combinations from the present. In that case we have uniformity and no question arises. But it is also possible that they vary independently, and that what

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[1] Chapter VI., p. 369.

we have here is a combination which is not repeated there, but is in fact variable. Concrete Reality as a whole certainly includes such variable combinations or, as we called them above, collocations. Any general system of Reality must give an account of these, and if the law of ground and consequent is universal it must show what their ground is. Now we may refer a collocation to a prior collocation, and this again to a prior, and so on indefinitely. On these lines we may establish a perfect uniformity of sequences among our combinations, but they will always be sequences starting from a combination which is variable and contingent, leaving our demand for universal uniformity unfulfilled. How are we to get beyond this point ?

2. We have, let us say, two cases of A, one in the combination AB, the other in the combination AD. We may ascertain that *a* is the cause of A and *b* the cause of B. Then the combination *ab* will produce the combination AB. Now if the relation *ab* holds between the terms as such, it is uniform, and unless we suppose a plurality of causes, it follows that the relation AB is uniform also. But AB varies, and it is this variation which we have to resolve into uniformity. We must resort then to a Plurality of causes. An antecedent *c* produces the combination AB, while a different antecedent *d* is responsible for AD. Whether this can be an ultimate account, whether the two antecedents which produce A would not on analysis reveal some point of identity in their own plane of time, we need not consider here. We may content ourselves with pointing out that if A and B are two distinct things or processes—and this is the case to be explained—there are only two alternatives. Either *c* is itself a combination of two elements *a* and *b*, which in their interaction are producing A and B, or it must be itself a process of change giving rise to AB. For, if *c* is distinct in character from both A and B, and is not a process that is simultaneously directed towards both of them, the change which produces them cannot be due to a simple continuation of this process. It is therefore due to something acting on *c*, which is contrary to the supposition that *c* is the sole and

sufficient course. But, further, if *c* is something which has no distinguishable elements and is not acted on from without, it may be a process of becoming, but whatever it is becoming, it is becoming as a unity, that is, it must be one thing, not two things. If, for example, it is something quite homogeneous throughout, it may be changing, but it must be changing homogeneously. If one part were becoming A while another was becoming B, there would be a variation without a cause of difference. It follows that *c* must consist of parts *a* and *b*, which, either independently or in their mutual interaction, are becoming A and B. Thus the cause of a complex effect must itself be complex, that is, it must contain elements in interaction.[1] This is not to say that it may not possess that unity of character and interconnection of parts which would lead us to think of it as one whole, but within it there still are elements, and there still is the problem of the connection between them, and apparently we shall not resolve this problem by reference to a simple antecedent. We should always be tracing back distinct strands of connection, and if we want to interconnect them we must follow a line which cuts across them. Mechanically we go back from one *de facto* collocation of elements to another. What is to combine the elements and transform the collocation into an interconnected system?

3. Bearing this point in mind we should write the causes of AB and AD not in single letters but in combinations as $\alpha\beta$, $\gamma\delta$, which we choose as making no suggestion that there must be any recognisable point of identity between the causes, other than the fact that they lead to effects having a common point. Now it is possible that $\alpha\beta$ and $\gamma\delta$ should each be uniform relations, α and β necessitating one another and γ and δ necessitating one another. In that case we have resolved our original difference. The relation AB is variable and the relation AD is variable, but each is derived from a uniform relation. But this

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[1] We are not to draw the inference that complexity cannot increase. We affirm only that in the production of a complex effect there is *some* interaction or correlated variation of different elements.

solution only raises a wider question. We have $\alpha\beta$ here in one relation let us say to something which we take as an object of reference as M, and $\gamma\delta$ there in another relation to M. Here again we may ask, are these relations variable or uniform? If uniform, if M is such that it always has $\alpha\beta$ in the relation to it which we find in the given case and $\gamma\delta$ in that other relation which we found in the same case, we have a uniform system in which there are various elements including the appearance of A in the combination AB in one part and in the combination AD in another part. We may symbolise the system

$$\begin{tikzcd}
\alpha\beta \arrow[r, dash] \arrow[d, dash] & M \arrow[r, dash] & \gamma\delta \arrow[d, dash] \\
AB & & AD
\end{tikzcd}$$

If upon the other hand M is not thus uniformly related to $\alpha\beta$ and $\gamma\delta$ we shall have to postulate something further as a ground for the two sets of relations which we actually find. For we may take a point of common reference R and find in one relationship to it the complex $\alpha\beta$ M $\gamma\delta$ and in another the complex, say, $\alpha\beta$ N $\epsilon\zeta$. We should then require a ground for this difference in the concomitants of $\alpha\beta$, and unless R itself provided us with the ground of the differences we should have to look further until we could find something which does perform this function, that is, we shall ultimately require a System in which all the terms that we are considering fall into their places in accordance with some law of necessary interrelation.

4. Remark, however, that in accordance with our previous argument we cannot in any event take M as a simple temporal antecedent of $\alpha\beta$ and $\gamma\delta$. Their temporal cause must itself be complex. It is the total which in continuing its serial process becomes $\alpha\beta$, M, $\gamma\delta$, and at whatever moment we take the process the alternatives will hold—either the relation of the elements is grounded in the elements themselves or in something outside them. Hence if we are considering the whole of Reality there must be within its constituent processes a grounded inter-

relation determining the actual complex which they form. The interrelation of the constituent elements, stable or changing, must be determined by the character of one or some or all of those elements.

5. To restate the heads of the argument. We are confronted with variable collocations and have to consider how they are to be reduced to a common ground without being annihilated in the process. Why have we A combined with B in one case and with D in another? Our first answer may be that there is a condition M under which A gives us B and a condition N under which it gives D. But, after all, this only substitutes the collocations AM and AN for AB and AD. Why is M here with this A and N there with that A? The only form of reply which will not repeat the collocation and which will nevertheless maintain its place in the system is that there is something common to both cases in which the variation itself plays a part. There is a complex structure, S, of which AM and AN in a determinate relation are parts. Now S is not simply the whole which AM, AN, etc., compose—that would merely repeat the facts—nor is it a unity from which they emanate—that would not explain their differences. It is a unity to which they stand in different relations. *Prima facie* we might think of it as a centre round which they are ranged, or as a principle of which they are the varying applications, as a plan of which they are the details, or as an organic system of which they are constituent parts. The essential is that S must itself be a unity of which all the parts imply one another, otherwise we shall have to find something simpler again to explain the variations which will arise, and it must be such as to require various elements, and elements of identical character in various combinations. It does not generate these elements, but is a principle of systematic relationship between them.

On this view Reality is a system of elements, not generated by anything other than themselves, capable of interacting, combining, breaking apart, recombining, in all manner of ways, which yield the concrete things and situations, temporary or permanent, that make up the history of the whole. But how are we to understand the ultimate relationship of each element to the whole? As being in existence without a generating cause, each element appears as self-maintaining, self-determining. There is no difficulty in supposing it to undergo changes of state or phase whether internally determined (for a regular process of change may be self-determined) or in response to the action of other elements, for the response is just the expression of its own nature as stimulated in a particular way. But there is first a difficulty in the determination of its position in the real order. It has its place in the system S, but as this involves its relation to other elements it is not determined by its own character alone but by the other elements as well. Each element is then subject to determination from without. But since to exist at all it must have some place within Reality and that a determinate place, it results that the element is not purely self-existent but also conditioned by the system as a whole. Self-determination, even of elements, then, is not absolute. It is a factor in the being of the element which has a necessary complement in mutual determination. We must say mutual since (*a*) each element limits the operation of others by its reactions and (*b*) each element contributes to the system by which the places of all are fixed. Reality then is a system of elements mutually determined, conditioning and conditioned by one another.

The same result, secondly, may be reached by another line of argument. Every part of Reality on our principle has a ground in the whole. An element, though without beginning or end, is still a part of Reality. Take it at any moment and we may say its ground is its own previous existence. But taking it as a continuous identity it is a limited segment of Reality, and on our principle is grounded in the system which covers the rest of Reality. Conversely, we may even say that a whole of Reality—and a systematic whole—is implied in the element, and, though the precise character of the whole is not of course determined by it alone, still it is one of the determinants. Without it the system would be different. So the mutual implication holds.

6. What now of the systematic principle? What is its relation to the elements which it combines? Can we regard it as built up of them like an organic whole from its parts? Consider any combination of continuants *pq*, and suppose that the combination *p*R*q* is a true consequent of *p* and *q* as such. This means that *pq* are indissolubly connected, and this is realised in a perfectly solid mechanical combination. But if *p* and *q* may appear separate and in other combinations this cannot be the nature of their union. Mechanical combinations, if not of complete solidarity, are of this type; and, though their internal laws—the interaction of their parts—determine their history when and where found, they do not determine the existence of the combination. Nor is the case substantially altered if for mechanical we substitute organic union, still regarding it as springing from the parts as such. Here the parts *p* and *q* may undergo correlated changes, but under the condition that they maintain the structure and one another in their essential nature. For all combinations that can be radically changed or dissolved, for all collocations and for the whole concrete Reality as involving them, we require a systematic principle operating in or upon elements otherwise indifferent. Now for any single collocation *pq* we had to suppose an 'external' ground *r*, because the elements do not of themselves form or maintain the collocation. But *r* must have a ground, and the search for a ground led us on to the systematic principle S, covering the whole of Reality. Does the fact that we are now dealing with the whole affect the relation of S to the elements which it combines. Must we say that at this stage the elements must determine the system because there is nothing else to determine it? The first reply is as before. The elements do not determine the system because many of them are mutually indifferent, that is, do not in themselves contain the grounds of their systematic relationship. It is only as combined that they constitute the system, and the systematic principle S is that which combines them. But since S, together with all the elements which it combines, is the whole, there is, it may be said, nothing else to act as its ground. Is it then

without a ground? Here we must discriminate. For S write St_1, the systematic principle as it exists at the moment t_1. This existent has a ground which is not the elements which it combines either as they now are or as they have been before; nor does it come from without. There is no without. Its ground is therefore its own previous existence. It follows that S is continuous and self-determining and coeval with the differentiated order of things. We may think of it as the structural or integrating principle which is the correlative of differentiation. It is, in fact, itself an element. It is that which correlates all other elements, elements in themselves changing, interacting and even conflicting, so as to maintain the structure of reality as an articulate whole of differentiated parts.

7. Here the question may be raised whether in the course of the interactions of elements the structure of the whole might not be altogether dissolved like the structure of many of its parts. What we originally required (it may be argued) is a ground for the existence of anything at its given place and time. This ground will be supplied by the existence of systematic structure at any given time; but if this structure were destroyed at a subsequent time by the interaction of its parts, the débris which would be left would still be an aggregate in which each item would have its place, derived from that which it had formerly occupied in the system.

Upon this suggestion we have to remark first that, even if we conceive the whole phantasmagoria of change as derived ultimately from a system which some time existed but could not maintain itself, if all subsequent world history is the running down of such a system, a declension into chaos on a gigantic scale—even so the elements must at one time have been held together in the requisite order. There was among them an integrating principle, and it effectuated its end, achieved a systematic order, even if it could not maintain it; there were elements not as such systematically related, yet a system was formed of them; there was, therefore, a systematic principle controlling them, and on our argument such a principle not being generated by the elements must be self-existent, it has a factor of self-determination. To suppose it ceasing to exist is to contradict the character of this factor. The actual system is constantly modified by the interaction of all its parts, and we may conceive the possibility that such internal changes might reach a point at which they would disrupt the system of reality as actually constituted. But this would be to destroy not the systematising principle but its work. We are familiar with the destruction of structures, organic or otherwise, in our experience. This destruction involves their resolution into elements and not annihilation. That this is generally true is the principle of substantiality which we saw to be a consequence of the law of ground and consequent, and to apply to everything which is self-determined, and this we have seen the systematising principle to be. It is indeed conditioned by all other elements because its operation must be consistent with their nature, but it does not result from any or all of them, *i.e.* it has a factor which is self-determining and therefore a permanent and integral part of Reality. If this principle can be annihilated any and all elements could be annihilated.

But there is another possibility to be considered. We have been facing the fact that the elements on which the systematic principle operates are not purely passive but have their distinctive characters issuing in modes of behaviour which may at any point clash with the requirements of the order into which they have been brought. But if this is so, such activities may equally well obstruct the achievement of a given order; hence the actual configuration of Reality is not determined by the systematic principle alone, but by that principle as operating on the possibly resistant and clashing elements.

In that case the actual structure of a given moment St_1 is a product of the operation of the systematic principle S on the interacting elements. It follows that the principle may not secure complete expression. Its position resembles that of a plan effectuated so far as the material in which it operates allows, and therefore incomplete, unless and until by continuous application it brings all the material into conformity. To this analogy it may be objected that if there is a plan of Reality as a whole there is no material outside it, nothing else in any determinate order (such as the particles of the potter's clay possess) to resist the plan. But there is material within the plan—every element that it contains, each with its factor of self-determination, and all the partial combinations, and resistances to combination, which ensue. Still there is no system of elements, no arrangement of them all except what S gives them. But it is equally true that S gives them only what they will take; the conditioning is mutual. The structure of a given moment then may be explained by S operating in and reacted on by the elements which constitute it.

Thus as to any St there are three possibilities (1) it might be an achieved system, the full expression of S; (2) it might be a system in the making, S as modified by the reactions of the elements; (3) it might be a degeneration from S once achieved but lost by their interactions. The last possibility is most improbable. If S has power to dominate all the elements once it should *a fortiori* have power to retain its hold where there is nothing further to impinge upon its structure. The first possibility is in turn difficult to reconcile with the facts. We should not find it easy to say what single principle of structure entirely achieved runs through the universe at a given moment. Undoubtedly our whole argument implies that there is or has been a configuration of things derivable from a common structural principle. But it also implies self-determination in the elements on which the principle acts. In this self-determination of parts there are infinite possibilities of obstruction to the principle which thus appears as of the nature of a force making towards a certain order of reality but encountering resistance. Hence the configuration at any stage of this process has its ground not in itself alone but in the direction of the forces creating it, which could be fully understood only by considering their goal in relation to the conditions on which they act. Thus though the systematic principle so far succeeds as to determine the configuration of the real, this is not the configuration which it would form if it found its material entirely tractable. It is not at every moment a structure in which the pure character of the principle is adequately and finally expressed. Now it is this intermediate possibility that finds support in the facts. We find structure everywhere, in the solar system as in the atom, and even common principles of structure. But we do not find it simple and complete. We find its component structures arising, flourishing, interacting, breaking down; on the whole, if any theory of evolution is sound, progressing. We are on the firmest ground then, if convinced that there is a permanent structural principle, in conceiving the expression of this principle as incomplete and regarding the structure itself as still in the making.

8. But our account is still incomplete. We must apply to the element of system, the centre or principle of co-ordination, the same argument as to any other element. It is on the one side self-determining, but it must also be grounded in the whole of things. Now its ground, we have seen, is not in the elements that it synthesises as they are apart from it. The only ground we can assign for it, as for any of them, is the whole concrete process of reality. True, it goes to shape this process and is therefore one of its conditions, and therefore, as we may admit, a part of its ground; but in regard to reality as a whole the argument that the ground must itself have a ground other than its own consequents fails because there is nothing else, and between the whole and its constituents the relation of ground and consequent not only may, but must, be reciprocal. What is a vicious circle in respect of a part of reality is a valid and the only ultimately valid interpretation of the Whole. The only ground of reality as a whole consists of all the constituents into which it is ultimately analysable, and each of these has its ground only in the whole. One of these then is S, the systematic principle. The elements which it systematises are in turn each and all of them conditions of the whole, and any particular self-determining factor which they contain conditions the operation of the systematic principle. It

is this principle, however, which expresses the mutual implication of all the elements, and when we consider the factor of self-determination and the factor of mutual implication, it is the latter which, if we may so express it, has the last word, for the elements of the whole must at least be so far compatible with one another that they are able to be woven into a consistent structure.

9. Our experience yields us three types of structure: the mechanical, the organic and the purposive. Since the concrete whole which is reality includes all manner of collocations, neither mechanical nor organic relations of elements as self-determining entities suffice to explain it. The basis of the system must be something that does not spring from the interrelated elements and does not rest on their co-operation, but is the original and independent cause of their co-operation. If then Reality is composed of a vast aggregate of parts, each with a factor of self-determination, in virtue of which, in greater or less degree, it acts independently and indifferently to the rest, we can find a ground of a comprehensive arrangement only in a factor limiting the independence of parts by interrelation, conditioning the position of each by some comprehensive common requirement. This must then be a principle original and underivative, making as such for system. The only principle of such a kind which our experience reveals to us in operation is that of Mind. It is here alone that we have found a form of activity which as such, without any extraneous conditions, combines, adjusts and remodels elements in such wise as to contribute to a common result, or, in more general terms, to constitute out of them a systematic whole. But unlike the minds of our partial experience, which function in systems co-ordinated by ancestry, the Mind to which our argument points as the root source of co-ordination operates with elements that are mutually indifferent and has all Reality for its scope. In fact, by regarding the systematic principle as Mind we get concrete meaning for the proposition that its ground is the concrete whole and more particularly the direction of the process in the whole which it subserves.

But if the purview of Mind is all Reality, the Mind itself is very far from being all Reality. It is an element, distinct from others in that its function is to correlate them. Still it is but a part, and its purposes, like those of ordinary experience, are rigidly conditioned. Hence it would be misleading to call the System purposive if that were understood to imply determination by purpose without conditions. The world system has purpose at its centre, but the purpose is subject to all the conditions that the elements prescribe. Purpose is condition and conditioned, and it is only in this mutuality that we reach the concrete view.

10. The conception of mutuality led us in the last chapter to the description of Reality as in a sense organic. Now we have seen that without the postulate of a comprehensive Mind the organic principle is certainly inadequate to explain systematisation. The reason is that the mutual necessitation of parts is of limited application, and that accordingly to explain the relation of indifferent parts we need a principle not derived from them, and this must be one principle conditioning all. But this principle is after all itself part of Reality, and if we bring it into the account as itself another element, that which interrelates all the rest, must we not still regard Reality as an organic system in the sense described in the last chapter? The correlating principle is not an organic whole formed of the elements, but that which, acting upon them, forms an organic whole. We argued in that chapter that there must be two contrasted and complementary principles involved in any organic concept applicable to the Whole; a principle of self-determination of parts, and a principle of systematic determination. We left to the present chapter the question of the nature of this second principle. Now retraversing the same ground from a different starting point we have been led to corroborate the necessity of the two principles, with the further conclusion that the principle of systematic determination is of the nature of Mind. Now the operations of Mind are grounded in the concrete whole, towards which they shape

the elements, and are limited by the nature of the elements; and if this seems to lead to complete dualism between elements and principle, we must point out that if there were no elements to work with there would be no systematising principle, and, as we have seen reason to think, every element must be in one respect conditioned in its very existence by the bare minimum of ultimate compatibility with the system. The dualism which we have to admit is then a dualism of factors, the self-determining and the systematic, contrasted yet implying one another within a system which may, in the sense defined and with the factor of Mind taken into it, still be termed organic. Mind itself is in fact the organising principle in the organism.

The essentials of the argument of the last four sections may perhaps be made clearer if we consider the possible ways in which the order of parts in any group may be determined without reference to antecedents and without going outside the group. Now on these conditions there are three ways in which the order within a group may be regarded as arising out of, *i.e.* as merely consequent upon, the character of its components, or as standing in a reciprocal relation of ground and consequent therewith. First the components may be in an order in which A determines B, B determines C, and so on. If this determination is taken literally as complete determination, we have a rigid system which would be inapplicable to Reality as a whole. The second way is that the components form groups in which each member is conditioned by the whole to which it belongs, but subject to that condition and to the impact of its fellow constituents determines its behaviour by its own energies. The different groups must next condition one another in the same way, *i.e.* must constitute larger groups in which the actions of each subordinate are conditioned by the maintenance of the whole. This ascent must be continued till we come to the whole system in which all the groups are thus interrelated. Here the elements may be said to determine the whole order, for each element in its very existence involves a specific whole and each specific whole a generic whole.

It is, however, obvious that the determination is reciprocal, for at each stage the whole also conditions the existence and behaviour of each of its parts. But, again, this conception is not applicable to Reality as a whole, for if it were so Reality would be a comprehensive organism of which the parts were organisms and their relations organic, *i.e.* conservative. This relation does not generally obtain. Things in general form many stable structures and some of them true organisms, but these are all subject to modifications and possible destruction by outer forces, from which it appears that there is in each an element of contingency and some elements not dependent on the structure but capable of entering into other combinations as well. Hence, lastly we may conceive Reality on the model of a group in which each element is conditioned by the whole, and this whole, being constituted of all the elements and nothing else, appears reciprocally conditioned by them all collectively, and so by each as far as it goes individually. But if we consider the order of elements in the whole, we find that this simple reciprocity requires further analysis. If each element has its own determinate place in the whole we may indifferently regard the several elements in succession as building up the order or the order as determining the relative position of each element; but if elements indistinguishable in themselves have different places and if the relations of elements are subject to change, the order is not a consequent of the elements as such. It remains that it is due to the whole, *i.e.* it is either a principle, or the effect of a principle, coextensive with the whole, conditioning the elements, but not derived from them. If the elements have any self-determination the operation of any such principle must be limited by their character and interactions. Hence the realised order is not itself the principle, but the effect of the principle as operating on the elements, varying in detail but interconnected in its variations throughout, *i.e.* systematic. It is this conception to which the whole which comprehends Reality conforms, and it is such an underivative principle which it involves. The operation of this principle is certainly limited by the character and therefore by the interactions of the elements, but does not arise out of them as a consequent. Subject to these limitations the principle can act on all elements, combining those that apart from it are indifferent to combination, and inter-relating partial combinations, and by so doing makes a system comprehending them all. Such general though not unlimited power of inter-connection is the characteristic operation of mind. Not being derived from the elements it is self-determining, *i.e.* is of itself of the nature of an element, but its relation to all the other elements is specific in that it is just that which makes of them all a system. Taking it into the account Reality is of course just the system of all the elements in their interaction, but of these one is the element systematising the rest. Since the elements collectively are necessary to mind and mind to them a measure of reciprocal necessity remains in virtue of which the whole is ultimately a system of mutually dependent parts, *i.e.* organic, but the organic union is due to an element not derived from the rest nor from their mutual relations, but conditioning these relations and exercising such a measure of general control over parts as only mind possesses. Lastly Mind is conative and aims at a system of value, *i.e.* harmony, and in the endeavour towards harmony it has to deal with the self-determination and consequent interactions of all the elements, with the result that the system achieved at any given time realises as much of harmony as it has been able to establish and no more.

In sum the universal order of Reality can be grounded only in a systematic Principle operating on elements having self-determining factors, subject to which it has generic powers of co-ordination. The system established at any given time is an adjustment in which the principle is realised in so far as the elements are brought into harmony with its requirements. The functions, operative powers, and limitations of such a principle are those which in experience are distinctive of Mind.

11. But this suggestion encounters grave difficulty in the imperfections of the world order. With this difficulty we will attempt to deal in due course, but it is so serious, and the question at issue is so important, that it would be well first to go back upon our traces and enquire whether there is not a method of understanding the existence of an ordered and differentiated world without postulating any systematic principle such as we have assumed. Let us first consider what we may call the generalised Darwinian conception. The world consists of mutually indifferent elements, each acting in accordance with its own internal nature in response to the action of others. Then it may be argued, whatever in the action of each is checked and thwarted by others, is continuously eliminated and only that which is mutually compatible remains. Compatibility is not in anything planned but comes about automatically from mutual friction and elision of opposing tendencies, a glorified rubbing off of corners. This would seem to produce a world growing constantly more uniform and limited in the action of its parts and we should be at a loss to explain the maintenance, and even what must at lowest be allowed as a partial truth, the actual evolution of differentiated types. In the biological field the Darwinian theory turned the edge of this objection by supposing an inherent tendency to variation in living things, not in any specific direction but in all directions indifferently. Most of the variations would fail, but some would succeed and the successful ones would form a centre from which further variations would ensue. Further variations on the same line would again in a proportion of cases succeed, and so step by step considerable differentiation would occur. What was insufficiently noted in this account was that the ground of success in each case was not primarily the elimination of the unsuccessful but the harmony or adaptation of the residue to their conditions. This was the cause of their success. The value of failure to the theory was (*a*) that it reduced the chances of inter-crossing. The unsuccessful individuals died out without mating with the successful ones who were thus left to inter-breed and establish pure lines. It also

(*b*) explained the normal adjustment of organic parts to needs, all maladaptations being perpetually destroyed. These advantages accrue only in the biological field, and only on the assumption of biological factors of variation and inheritance. When prayed in aid of an ultimate ground of the causes of an ordered system of being, they reveal their limitations. It becomes apparent that elimination is not a cause of variation, but only of the gaps that come about between differentiated types that may be supposed to have arisen by continuous processes. The actual grounds of differentiation (if we suppose a homogeneous origin) are either some definitely directed variations or a general variation in which there are some products which harmonise with conditions. The directed variation, if it is ultimate (not in turn requiring explanation) will take us back to some kind of intelligence. The other alternative involves at least certain possibilities of harmony in the structure of things. Though this harmony may only be found as it were in time by the process of trial and error, it yet cannot, when we are viewing things as a whole, be regarded as an accident. Harmonies and disharmonies must underlie the processes of things, conditioning their variations, eliminating and preserving, the harmonious types, from the nature of the case, tending to be more fully realised as the processes of differentiation go on. Hence the alleged independence of elements, on which this account was to rest, is dissipated. It is the interrelation of parts which determines the world process, and we are once more back at the question of the principles of this interrelation. Can we have any interrelation except that of some unitary principle controlling all necessary elements ?

An even more radical solution than the above might be attempted on some such lines as the following. Let us suppose a world-aggregate of elements which we need not to think of as arranged in any definite ways to one another because they are all homogeneous, so that any one might be replaced by any other. Let us suppose, however, that they may be variously grouped and that any group may acquire a distinctive character, special relations coming about between the parts according to the nature of their grouping. Aggregates then might act as individuals, and differentiation in the clash and co-operation of individuals would come about in the infinite variety of relations that would ensue. As to the grouping of the aggregates, this would require no ground except those laws of grouping which we assume in the theory of Probability; that is to say, every possible form of aggregate will exist in numbers proportioned inversely to the number of conditions which it must satisfy. If we find a highly complex individual with very distinct modes of behaviour, its origin is in a grouping which, however rare, might be calculated upon by anyone considering all the possibilities of grouping and the number of cases in which each sort of group would actually occur. It is just one case of the multitude.

On this principle it must be replied the only account that we are allowed to offer of the existence of any particular aggregate, is that it is one of a multitudinous whole. Its existence implies that of all sorts of other aggregates in all sorts of relations to it. Far from being intelligible in isolation, it is explicable only as a member of a whole, and the very independence of elements and aggregates of one another is their utter dependence on the whole. It may be a queer sort of world scheme which is suggested, but it is a world scheme (and one in which all parts are homogeneous except in so far as some sort of Lucretian void is implied in the mere admission of differences in mode of aggregation). All are mutually indifferent, and all in particular must as elements be mutually compatible since they tolerate all sorts of grouping. How did these relations come about in elements which in their origin have no mutual relations and no common cause? By what kind of accident is it that an infinity of separate independent things turn out uniform, compatible and capable of aggregation, by which again all the various forms of aggregate fall into a single comprehensive scheme? Once again, if we hold the view that a ground of all things and their arrangements is to be found, we are driven back upon some comprehensive principle conditioning the existence of all those elements which we started by assuming to be entirely independent of one another and of any common scheme.

12. It may be objected, lastly, that in our account we are after all only hypostatising an abstraction. What we truly know is that reality must be a systematic whole. We have taken the elements of this whole in abstraction from their relation and find them, so taken, indifferent. We have then taken the relations by themselves, conceived them as acting upon the parts like a distinct element, and have so rebuilt the whole. But in so doing it may be said we have transformed abstract designations of the real into separate operating elements. The reply is that so far as this result has come about it is forced on us by the nature of the facts in relation with our principle that any part of the whole has its ground in the whole. We find the parts of the world operating in many aspects indifferently. It is on this indifference that a great part of our ordered knowledge is built up. But by the law of the ground we infer that there must be a more ultimate correlation behind this indifference. Hence (*a*) there is correlation, but (*b*) the correlation is not directly necessitated by the elements as such ; it has a separate source which in action is opposed to their indifference, and it is by these two opposed actions that the harmony in disharmony of the world that we know is generated. This source is itself of the nature of an element, only one that interconnects all other elements, conditioning all, correlating all, forming of all a system, the systematising principle which achieves its function in the actual concrete world.

13. But we must now deal with the great difficulty admitted above, as arising from the imperfections of the world order. If this order is to be the work of intelligence it must be something that in its operation satisfies intelligence, and that a much higher and more comprehensive intelligence than ours. If we say that it is so much higher as to be inscrutable to us we merely cut away the ground on which to impute any intelligence at all, for we can only impute intelligence on the strength of evidence of ends

to which means are co-ordinated, and if the ends are not in any way appreciable by us, that is as much as to say that the evidence for them is non-existent. Piety thus arguing defeats itself. Now the only end that we have seen so far is the world as we know it and its maintenance with all its discords and disharmiones. But the aim of mind, as we have seen it, is harmony so far as its sphere extends, and the aim of a world mind can be nothing short of world harmony. In arguing for a world mind or central mind correlating all elements we seem then to prove far too much. If such a mind is responsible for the world why is it not a better world, harmonious through and through, not merely a curious structure shot through with discords? The answer is that in so putting our question we are only looking at one side of the shield. The unity of mind conditions all elements, but it is also conditioned by them. Their interactions are infinite, and in themselves they are indifferent and mind has to deal with them all. We argue to its existence on human analogies, and precisely on that analogy we conceive its position as comparable to that of the wisdom of man raised to a higher power confronted with a problem of scope and complexity equally raised to a far higher power. Our wise man has to deal with conditions and is successful so far as the scope of his understanding and control extends. The understanding of the central mind may be infinite, but its problem is also infinite. It is the adjustment of the infinitude of combinations among infinite elements through infinite time. Again applying our analogies the wise man learns by experience, uses his partial successes and gathers strength for more. In a long life he may reduce a little patch of his world to order; if we could multiply his years and his power we could extend the achievement. Similarly if there is a central mind of the world ordering and transforming its elements into harmony, if this mind is permanently at work, we should not expect to see its work done all at once. We should expect it to grow, and harmony in its operation along with it. But this is exactly what according to our empirical account we actually find in evolution. We see the central mind not achieving its supreme end at a stroke, but growing in power, advancing as the minds that we know advance from stage to stage, with the harmony of the living world as its goal. There is the beginning of harmony in the bare fact of the mutual compatibility of differentiated elements in a permanent order. This is the testimony to the operation of mind in the foundations of the world. Development is the testimony to its growth in power and in success.

14. The goal of Mind is Harmony, *i.e.* a system in which all the parts support one another. To the perfect realisation of this ideal in the Whole of things there are probably limits inherent in the nature of mechanical elements. Elements which cannot be modified have to be subordinated by adjustment and combination to the service of harmony if not strictly to participation in it. But whatever be the limits of harmony, to those limits it is the function of Mind to advance, and in the maturity of Mind everything, either by participation or service, has its place in the harmonious system. We can therefore assign an intelligible goal for the effort of the central mind by relation to which its activities are governed. We can see its rudiments in the very existence of a durable universe of differentiated elements. We can form some conception of the obstacles to its realisation, and read in the history of development something of the advance towards attainment. Mind is not all reality nor all that moves or exercises control. Fundamentally it is an element in reality, and though it is primarily the element that systematises yet in systematising it has all the infinity of other elements to adjust, modify, control. On the organic view of reality every element is at once a determined and a determinant. It needs its fellows but it asserts itself among them, not only finds a place but makes a place, pushes its own way and contributes its quota to the structure of the whole. It would be a miracle indeed if all the infinitude of such elements found the line of possible harmony at a stroke, and such a miracle was not performed in the day of Creation. We have to be content with the lesser miracle, that there is a way of harmony which one element

in the world, Mind, the seeker after harmony, may achieve in the plenitude of time.

To complete our hypothesis we ought to describe the *terminus a quo* as well as the *terminus ad quem* of development, but any such attempt opens a wide door to fallacy. If we attempt to conceive something from which differentiation and integration could start we form the notion of a structureless world. Perhaps we are not incapable of forming such a conception by a kind of idealisation of the blank, the monotonous, the drab, but if we try to think of such a monotony as the full account of reality in its beginnings we are at once faced with the difficulty that mind, which is to evolve structure out of it, must already exist. We have therefore not unbroken monotony but a dualism, and a dualism of stark uncompromising contrariety. The reason of this impasse is simply that mind is an element coeval with the rest and an essential condition of their existence. A world without mind is therefore an abstraction, not a real condition of things.

But further than this the method on which our conception is formed is open to criticism. If we suppose order vanishing, distinctness and articulation vanish with it. Whatever is distinct must have its place relating it to other things, but it does not follow that strain, stress and opposition vanish with distinctness of being, only they must be diffused everywhere, yet nowhere concentrated, inherent in being but not yet defined, localised, individualised. This is perhaps our nearest approach to a picture of chaos, and we might correspondingly picture the first work of Mind as dividing the light from the darkness, giving to the interfused contrarieties the definiteness of distinguishable being. Mind then would not be coeval with the beginning of order, but antecedent to it, and therefore to the emergence of distinct elements which is on this view roughly comparable to the precipitation of a solution; and before Mind achieved differentiation and order it would still function in the undifferentiated medium as at once the principle of integration and the effort after complete and harmonious self-expression in a unity in which all self-expression is inhibited by mutual pressure, in which therefore liberation and differentiation are the steps by which harmonious integration must be approached. This is indeed the natural conclusion of the view to which we were forced, that the inherent character of the elements must condition the order actually achieved among them at any time.

Yet the very terms in which we essay to define this conception imply that we cannot give it the clarity which the absence of distinct elements denies, and we must accordingly recognise that the concept of the structureless is a limit which we do not reach. We get nearer to it as we reduce integration and differentiation, but in doing so we approach not a world of blank and inert monotony but one labouring in strain and stress so ubiquitous that all distinct activity is obliterated. Yet in this very statement differences within a whole are implied, and at the point at which they vanish reality itself as a concept of definable elements eludes us, nor is there any last term in our ideal approach, nor assignable first term for the constructive process. We may hope to explain reality in the sense of resolving it into permanent principles covering its variations and determining its movement. We may trace the course of movement forwards or backwards in time, describe its principal stages and learn their conditions. With these topics we have already dealt and shall have something to add in the next chapter. We can do so much without seeking to get outside reality and assign its beginning and its end. Harmony is not its temporal end, for harmony is a continuing life, and what further possibilities there would be in such a life we are again, I think, without data to determine. All we can say is that the structure and process of reality as we find it is determined by the effort of mind towards harmony among elements which but for it are mutually indifferent.[1]

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[1] The systematic principle of this chapter is, it will be noted, closely allied to the Holism explained by General Smuts in his valuable work. I have ventured to apply the principle to Reality as a whole, and to identify it with Mind.

CHAPTER X

DEVELOPMENT

1. The general theory of development arrived at in the last chapter is in the broad corroborated by the empirical evidence adduced in the first part of this work. We have throughout seen mind in growth and partial harmonies correlated with the phases of its growth. But when we bring the empirical evidence into contact with the analytical argument, two points of difficulty arise. In the first place, development as known in experience goes forward in various ways and in very numerous centres. We have seen that these movements must be in some way correlated, but the mode of their synthesis requires further investigation. Such synthesis would be that development of the structure of reality as a whole which our theory requires. But with regard to this development a second difficulty arises, for to many any such conception is an offence. They think that development is in essence a partial process and that any conception of a development of reality as a whole involves absurdities.

We will examine these points, starting afresh from the conception of development, and we will begin by asking in general terms what development is. What is meant when, comparing two individuals or two types, we say that one is more developed, more mature, more highly evolved; the other relatively crude, undeveloped, rudimentary? (1) We may use the expression with reference to some assignable character and its presumed genesis. Here, *e.g.* is a given organ of a given animal. It has such and such a structure and function, definite and clearly marked.

By the aid of embryology we can trace it back through successive stages to a certain portion of a layer of undifferentiated cellular tissue. It begins, that is to say, by being something generic, to all appearance like other cellular tissue of the same individual, and not only of the same individual, but of embryos generally at that stage of their growth. From this it differentiates out, acquiring by a continuous process a character which is more and more distinct. The development of such an organ then has a perfectly clear meaning. It is a name for the continuous process of modification by which an object of distinct and well-marked character comes to attain that character. (2) Thus, when we speak of the development of something definite, there is no particular difficulty about the import of the term. It is when we speak of development in general and oppose it to arrest or decay that the question of meaning arises. When the animal dies and the organ that has been in question undergoes decomposition along with the body as a whole, a new process of continuous modification sets in by which a new result is arrived at, but we do not think of this process as one of development, but rather as one of decay. We might indeed, relatively to the idea of decomposition, still use the term development—the decomposition is more or less advanced, it progresses from small beginnings, becomes well marked and then complete. But without the qualification we should never use the term development of this process. It is just the reverse of development. Thus we seem clearly to have and to apply some notion of development in general, as a process having a certain distinctive character or trend opposed to a reverse process which we call that of dissolution or decay, and it is clearly this general sense that we shall require if we are to speak intelligibly of the world-process as a whole as a process of development. To beign with, in the instance taken, which is typical enough, we clearly predicate development of the process by which the organ acquires distinctive character, and this distinctiveness, again, involves a combined arrangement of parts, a certain formation involving a joint working of tissues—as, for example, the attachments of muscle, tendon and bone that make up the essential mechanism of a limb. There is in the ordinary phrase a combined advance in differentiation and integration, and this combination only becomes more conspicuous if we turn from the single organ or limb to the entire organism. It is, as compared with any stage of the embryo, highly differentiated, while it is also, as compared with any stage but the very first in which the embryo is a single cell, more completely integrated—its parts, that is, are more definitely adapted to the requirements of combined action. Putting the two points together, we find that what has happened is an extension of the organic character, and that is, again, a more complete co-operation of a greater aggregate of parts and of forces.

2. The paradox in the conception of development, and the standing difficulty in all theories of its nature and conditions, lies in the question in what sense the germ can be said to contain the developed organism. If the undifferentiated cells are really undifferentiated, if, that is to say, they are in their inmost structure just like any other cells, why do they give rise to this particular organ or organism and not to another? If, on the other hand, they are really different from the first, the process of differentiation is only apparent. The adult is preformed in the embryo, and what really happens would seem to be rather a sort of unveiling of what is already there, than a true growth of something new. How far does our slight account of development enable us to turn this difficulty? Let us take up the question again at a different point. Mechanics tells us that in any system, as long as it is uninfluenced from without, the sum of energy is constant. But any portion of this energy may be unapparent. For example, a weight lying on a scale is also suspended from a point by a string so that it barely presses the scale. In this condition it is in equilibrium. This means that several forces[1] are being exerted, and in particular the downward pull of the weight and the upward pull of the string; but these

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[1] Meaning here and in the rest of the discussion by a 'force' whatever tends to produce or inhibit motion, or, generally, any change.

forces are balanced. So far as any change, any movement is concerned, they are opposing forces and they cancel out. If the arrangement is disturbed by the snapping of the string, the balance is destroyed, the downward thrust of the weight has its effect. There is a transference of potential into kinetic energy, and there is something that may be called an evolution of motion and a performance of work. In fact, we speak often of an evolution or development of specific forms of energy as of sound, heat, light, an electric current and so forth. We may, indeed, conceive kinetic as a development of potential energy, and we observe that the mode of development is this—that where there is potential energy certain forces oppose and balance one another, and that given a readjustment which removes this opposition, each force has its own way and works itself out in some appropriate movement.

The kinetic energy liberated may theoretically perpetuate itself indefinitely, *e.g.* a projectile launched on a path free from all interfering forces would maintain its motion eternally in a straight line, or if moving in a frictionless medium within the influence of some large body, would rotate about it as a planet. But, normally, the motion of one body is interfered with by others and it is brought to rest. Some of its kinetic energy is then re-translated into potential, but the whole is never restored. On the cessation of molar motion the kinetic energy takes other forms, and some portion of it is always frittered down into heat. If the heat could as a whole be collected again and brought to a focus, the sum of the original energy would be restored and the entire system in its new form would possess a potential energy equal to that with which it originally started. But this physicists believe to be impossible. They accordingly draw a distinction between energy as such, and the energy which can or could be made available to do mechanical work, and tell us that while the sum of the former is constant, that of the latter is perpetually diminishing. There is a steady dissipation of available energy measured by the increase of ‘entropy.’ Thus the mechanical view of the universe, in strange contrast with that of biology and psychology, seems to contemplate a process of steady degradation or dissolution rather than a process of evolution or development. We start with a system of energy stored in many centres of high potential, and as we trace its liberation from these centres and the display of its nature in motion, we have to recognise at every point a final dissipation into a form in which it can no longer produce any recognisable effects.

That this can be a full account of the universal process is impossible, for the simple reason that it gives no account of the original storage. It assumes in Ostwald's way of putting the matter, a perpetual transference of energy from the points of greatest difference of potential to a state nearer to equilibrium, but it gives no account of the manner in which the difference of potential originally arose. It is clearly a one-sided account, as might be expected of a purely mechanical view, and rightly interpreted it is an admission of the inadequacy of mechanics to explain Reality, but it must be added that the suggestion of 'degradation' is in fact unwarranted. It is potential energy that is really undeveloped. It is energy held up by energy, cancelled, amounting on the whole, as long as the opposition lasts, to nothing in the life and movement of the universe. It is always the liberation of such energy that sets process going and whatever may be 'dissipated' in the process, without the unlocking we should have a frozen universe. What the physical argument shows is that in the unlocking of energy from which, mechanically speaking, all changes proceed, some portion of the original store is always dissipated, in such wise that no further definite series of ordered facts can be derived from it. Hence, at one end we have energy locked up; at the other, energy dissipated. In the intervening process lies all the ordered movement of Reality, certainly all that we should include in the genesis, rhythm and mechanical interaction of structures of all kinds. But there is no reason to think of the whole process of things as ending in the nullity of dissipation. If reality is infinite, so is its sum of energy, kinetic and potential together, and such a sum is not exhausted by the constant dissipation of a portion of it. If, in accordance with modern conceptions, we think of energy as finite, we shall also have to think of space and time as finite; indeed, if we think of a finite sum of energy, ceaselessly dissipated through infinite time, it is clear that all must have been exhausted not only long ago but infinitely long ago. In fact we have a contradiction, and no such account of the universe is possible. If Reality is finite the dissipation of energy within finite time will be a question of rate in relation to the initial quantum, with regard to which I do not know of any data. If, again, we think of all process as finite, having a definite beginning and end, the important question is what is achieved in this finite time? It might be, for example, that a harmony involving a progressive diminution of loss is in progress and that at the limit no physical change occurs because none is necessary to a completely spiritualised being. Such speculations really take us back to the region which we traversed above, and are set down here only as indicating that if we once begin to imagine what would happen in infinite time the possibilities are manifold, and the subject does not lend itself to such dogmatic conclusions as those which sometimes prove tempting to certain physicists.

So much in passing, but let us note for our purpose that the reason why heat, which is energy in its most dissipated form, is imperfectly available for the purpose of restoring an equivalent of mechanical energy is understood to be the random and chaotic character of the molecular movements by which, physically speaking, it is constituted. If in the equilibrium which yields a store of potential energy, we have opposed forces cancelling one another and so yielding a zero of any apparent effect or real change, in heat we appear to have a chaos of movements producing no combined effect because not reinforcing one another in any given direction, but working against or across one another to no certain end. As soon as we can concentrate heat in sufficient amount upon, say, a certain mass of water, we get a definite series of distinct changes and the evolution of steam which can do mechanical work.

These mechanical considerations are of value to us mainly as yielding a hint of the true relation between the potential and the actual in development. We find that on the mechanical plane (1) the energy operating in any process of change always pre-exists, but the forces possessing this energy have been inhibited by counter forces of equal energy until the process of change began; (2) that what the physicists call available energy, is, at a minimum, energy that can do some recognisable work, *i.e.* produce elements of movement so related as to sum up to something distinguishable, while the same quantum of unavailable or, as we may call it, undeveloped energy cancels itself, either completely by continuous opposition or by such ubiquitous cross currents of counter tendencies as swamp any change in its beginnings. The very lowest stage of advance would be the liberation of some force from those which counteract it, but anything that we can call an order involves some joint working, some relation of forces which will form a whole of distinct character. Mechanically considered—and the whole process of Reality is mechanically conditioned—development consists in the rearrangement of forces so that from a state in which they conflict with one another and produce no regular series of changes (potential energy), they come to work in definite relation with one another, so that while each is responsible for some series of changes or some feature of such a series (kinetic energy), they together build up structures of definite types and relatively enduring character.

When at the close of the last chapter we considered the possible beginning of development we tried to think of it in a world without differentiation, and this we found to be impossible. We can now confirm the alternative view that as we retrace our steps, *i.e.* conceive the work of Mind continually diminished, what we approach is a world not of blank sameness but of energies at every point thwarted, cancelling one another because unco-ordinated. The limit towards which we tend is not so much one of blank homogeneity, as one in which for lack of co-ordination, elements pressing on one another hold one another locked so that none can acquire individual expression. Development lies in the conversion of this conflict into harmony.

3. This process of development goes forward within the inanimate world, and that is why I have used the term structure instead of that of organism. Every organism is a structure, but not every structure is an organism. A structure is a whole constituted and maintained by interacting parts. The behaviour of each part is affected by that of others in some way which is distinctive and which is such as to give to the whole a definite character and a definite mode of behaviour—a line of action persisting in time which will only be modified by the impingement of some external force. The solar system is such a structure. It would appear that the chemical atom is such a structure, its elements being the corpuscles, and the binding force the electrical attractions and repulsions that constrain corpuscles to assume certain alternative mutual relations. Matter itself is now recognised as a vast store of potential energy, in that in every atom opposed energies are locked in tight embrace. The union, however, is not absolute, and it seems to be by the relation of the constituent electrons to those of other atoms that atoms are internally modified and that they form higher structures, which are molecules of the chemical compounds. But in all mechanical structures, and the chemical is assumed to rank ultimately with the mechanical, though the parts influence each other's behaviour, the action due to each is unaffected by the remainder. The mode of action characteristic of the part persists unchanged in whatever combination it may be found. Every force in a mechanical structure operates with its own magnitude and in its own direction, and, if the rest of the structure were suddenly dissolved, would continue to operate in precisely the same way. Only, as any element operating with such force is at the same time operated upon by other elements of the system, the actual behaviour of that element is a new product determined by the composition of its own forces with those acting upon it. In an organic structure, on the other hand, the union is more intimate. Though every element of the organism has its own character, this character stands as such in relation to the character of the whole to which the element belongs, and if that element

is removed from the whole it is modified or destroyed. There is not only a specific interaction of parts, but an interdependence of parts complete in proportion as the organic character is developed. In the organisms that we know, and so far as we know them, this completeness is never fully realised. In the living organism the material particles do not owe their mechanical character to the life of the whole. What death destroys is not the weight or the mass of the cells, but the capacity for that combined operation by which, could it begin again, the life of the individual would at once be restored. The elements of the living being, that is, are in part of mechanical character, and so far as they are mechanical they persist unimpaired by the fate of the individual whom they have constituted. But so far as they are truly organic their character depends on the life of the whole.

4. How the living individual first comes into being is no doubt the crux of all theories of development. The dilemma has always seemed to be absolute. Either life is eternal (*omne vivum ex vivo*) or at some point of time absolutely lifeless matter becomes alive. The first alternative is negatived by all that we know or reasonably infer about the earlier state of the world as incompatible with any form of life. So far as this earth is concerned the difficulty has indeed been resolved by the rather childish resource of conceiving germs of life as arriving from some other planet, but this is the Hecataean method of banishing the difficulty to the region of the invisible where no suggestion can very well be confuted. On the results here reached two things at least may be said with some confidence. On the one hand there is no question at all of the ultimate origin of life as distinct from the ultimate origin of things, for Mind, which certainly has life, is coeval with Reality. The question then is altered. It is not a question how Mind originated but how or why it took shape in limited and confined individual centres, thus constituting the living organisms that we know. Secondly, there is no reason to suppose that it first constituted dead matter by co-ordination of elements and then breathed life into some

of its parts. Matter has in the end proved itself less immortal than Mind. It is a compound, and we ought not to regard its component elements as themselves matter. Matter is the union of elements locked together in a peculiar way, and the union, however stable, is not absolutely indissoluble. There is no theoretical difficulty in conceiving these non-material elements as united in a different fashion, *i.e.* in such a way that instead of merely holding one another balanced and bound to an endless whirl about a centre, they co-operate in a plan of growth and self-maintenance through change. This means of course that there is mind, an element of Mind, within them, and this we have seen to be in fact the more probable interpretation of the facts of organic life. Again, we have not to think of the mind factor as something altogether outside the elements, coming down upon them and setting them in order after the mode of Anaxagoras, but rather as conditioning the elements from the first, striving for dominance within them and finding its way by differential grouping, the first result of which is individual life.

The difficulties in this account are not to be blurred or minimised. They are first empirical. (*a*) We have no evidence of the actual origins of life from the inanimate. In our experience, life only comes from pre-existent life. But on our theory we should not expect to find life originating from inanimate matter. Matter is a structure in which the primitive elements are already securely locked up. If all the world now consists of matter, animate or inanimate, then all the formative elements have been already shaped into stable structures. The inanimate structures could not come alive unless they were first broken up, and if there is ever to be any experimental demonstration of originating life it must, one would imagine, be in connection with some development of radio-activity, the material union being dissolved in order that the elements may be recombined into living wholes. Putting it mythologically, the world-mind found the path of possible advance towards co-ordination by forming relatively few and tiny centres of life while co-ordinating all the rest into material structures, and it cannot go back on this path but can only go forward by organising the individuals into higher organic syntheses.

(*b*) But living organisms are themselves material, with ascertainable physical and chemical properties. They do not consist of the uncombined pre-material elements, but of the united atoms and molecules in interaction. This is not so certain. All living things have bodies but whether the body is the life, *i.e.* whether the vital processes are the total of a set of mechanical interacting elements, is precisely the unsettled question to which we have seen reason to think the more probable answer is in the negative. What is certain is that the living element absorbs the material into its system or uses it as an instrument. That is the basis of organic growth and maintenance beginning with the germ which has food-stuffs laid up within for the living elements to absorb as they grow. The life is not in the yolk but in the germinal vesicle which absorbs the yolk as it grows, its peculiar power being to suck all the energies in the yolk into itself and to dispose of them in accordance with the requirements of its own system. We can trace this process back, finding progressively smaller centres of organising activity, but of course we shall never see by the microscope a centre which is invisible or weigh on the scales something which is imponderable. On the other hand we do not successfully resolve the organising activity into the laws of the visible and ponderable as they are found apart from it, and at lowest specific experience leaves it open to us to consider this activity as distinct from that of formed matter. Certainly it does not, within our experience, exist without matter to act upon or within, but that does not prove that it is itself matter.

The graver difficulty is theoretical and may be put roughly in this form. How does mind come to divide itself and more particularly to shrink, like the genie in the bottle, to the size of the tiny individual; to limit itself to the interests of the organism and, so confined, fight for its own individual being against its own self as similarly confined in other cases? The simplest answer would run on some such lines as the following. Throughout we have treated Mind not as a purely self-subsistent reality but as an element related to other elements, conditioned by them while it conditions them. That is to say, it needs such elements for its own being, and the process of development comes about through its endeavour to overcome them as far as they thwart it and to subordinate them or absorb them into its own nature as a harmonious system. We cannot tell why it has followed one method rather than another, but can only suppose that the method followed was the only one actually found possible, the elements being what they are. Experience shows that this method was that of differentiating the whole structure of things which was dominated by the dissidence of elements into co-ordinated groups in a minority of which a fuller subordination was achieved and an effectual instrument fashioned though for very limited purposes. Further development took place by the liberation of this instrument, selection of the fittest, combination of parts and so on, furnishing Mind with progressively improved instruments of fuller and more perfect expression. On this view, mind is really one and homogeneous everywhere, in the flea and in the dog, in the savage and the poet, and it is only its instrument which is less or more polished.

This view, which would make things fairly easy, is, I fear, too simple. In the first place developed individuals differ from one another not merely as bodies but as minds or souls. The mind does not use the body freely as an instrument but is also under its influence. Not only its weaknesses but its strength have bodily sources; glandular secretions are necessary to make us men and women, beings of romance or criminals. Such influence is perfectly compatible with a true psychical activity, but hardly with the view that all that is physical is merely an instrument of such activity. The union is closer and more intricate. Above all, the limitation of the mind is seen in the narrowness and consequent antagonisms of its impulses and purposes. We act selfishly not because an imperfect instrument glances aside as we strike with it, but in the sense that we are looking only at our own aims, not those of Mind as a whole. It is only in the higher developments that this limitation begins to be overcome. If there is mind at all in the lower organisms it is mind cut off and psychically regarding its own to the exclusion of all else.

However much it may add to our difficulties, then, we are, I think, forced to conceive mind in the organism as a true individual, not merely as a segment of a common or universal Mind, and we must recognise that in the very process of expressing itself, realising itself in the form of the living being, it has lost as well as gained. This, indeed, is only what we find throughout development, and what we can understand as a consequence of the struggle of one element in reality for dominance in the infinitude of elements which it interrelates. They are necessary to its being; their complete absorption or subordination is necessary to its fulfilment. The path to this subordination lies through a series of partial correlations, and in these something has to be repeatedly sacrificed that something more essential should be gained. This loss affects the mind-element which enters into the partial systems which are constituted by the operation of Mind as a whole. It becomes that individual mind with all its limitations and perhaps perversions, and in particular its union with the rest of the mind world is overborne until in the progress of Mind's efforts generally the higher syntheses are formed within which the underlying unity can reveal itself and eventually resume its supremacy.

5. The conception of the origin of the physical organism thus indicated will be seen to be merely the application of the general principles of development to a world in which conational and mechanical forms of energy are held to be the two moving factors. Neither of these by itself constitutes the living organism of our experience, which is a psycho-physical unity, that is, a synthesis of the two factors. It is also a synthesis effected by differentiation, for the element of conational energy, informing a system of the elements of mechanical energy and to that extent marking them out collectively from other mechanically active things, is at the same time absorbed by them and

to that extent marked out from all other conational activity. Hence the resulting organism is self-centred and in relation to others acts 'mechanically,' *i.e.* indifferently, on its own plan, which has no regard for their's. But to this form of mechanism there is the final limitation that every organism has within it the germ of mind and therefore of union or reunion with other mind if the mechanical divisions can be overcome.

With this limitation in mind, we can see that the organism once formed moves, like any structure, on a path prescribed by its internal arrangement. It is regardless of everything else, except so far as affects its own fate. Indeed, any symptom of a correlation of its behaviour with that of others may be taken as an indication of the beginning of a new synthesis, whereby the organism will enter as a constituent into a higher system. But as compared with the mechanical structure, two main points have to be noted in the behaviour of the organism. The parts being adaptable to the needs of the whole, the organism has flexibility, and its line of action takes the course of a regular development to a stage of maturity at which the organism gives rise to another or others of the same general type either by division in the case of uni-cellular organisms, or by combination (sexual conjugation) following division (maturation-divisions of the gametes) in the case of higher organisms. Secondly, in maintaining and developing itself, the organism lays hold on the outer world, converting the energy of the environment, in the form of food, into energy subservient to its own needs, and in greater or less degree rearranging the environment generally in such wise as to further its own ends. This is not organicity, but organisation—organisation being the arrangement of elements that remain mechanical with the view of producing certain ends. Such organisation is the servant of the organic principle, which by means of it secures its own development.

We find then in organic development four moments or distinguishable sets of conditions.

i. In the formation of any new organism there is either a separation of factors previously held together or a union of factors previously separated or a combination of both processes, the result being always a new individual of more or less distinctive character.

ii. In the organism so formed the operation of parts is conditioned by the requirements of the whole which are such that the organism maintains itself (under certain environmental conditions) through change and generally undergoes a certain harmonious differentiation and reproduces its kind.

iii. Both as a condition and result of this development elements of energy originally foreign to the organism are absorbed and arranged so as to subserve the organic movement.

iv. By reproduction the organism maintains a type which is only varied (*a*) by differing environmental stimuli,[1] (*b*) internally, by special differentiations or syntheses, the exact nature and conditions of which are not yet adequately determined.

It is the second 'moment' which principally suggests pre-formation in the germ of the mature individual, but even here there is not necessarily any real identity of character, though there is true continuity of individual being. What must exist at the beginning is not the developed structure in miniature, but rather something that will seize on all that comes within its grip and throw it into place in such fashion that bit by bit the structure will grow. As in a country dance a person standing at a certain point and giving his hand to dancers in succession will swing them round in a definite direction, and so produce in the end a new formation, so we may conceive the organic system dealing with all that comes to it, and after selecting what it can absorb and extruding what it cannot, throwing each item that it retains into the position in which it will form part of the matured order. For this purpose the germ need not be in the least like the matured order. It must only have a mode of operation, which is determined by the needs of that order. Indeed, neither the fertilised ovum nor the chromosomes, nor the hypothetical rows of genes bear the least resemblance to the emerging individual. All that can be said is that the germ with all its elements operates as a whole in ways determined by relation to that which is to come out of it. In this respect it resembles a purposive idea, and we have in fact seen reason to impute some conational activity to all organic life, but of course it is not till far higher levels are reached that true purpose emerges. Only in the physical development of the embryo there must (in spite of the atomistic tendency of much modern research) be a normal correlation of the action of the genes constantly maintaining the equilibrium of the organism through all the changes involved in the emergence of each new feature. In view of the power of the growing organism to adapt itself to changed circumstances, even, in the case of certain special stimuli, through drastic structural departures from the norm, the process looks (I will not put it higher) like that elementary form of conation which consists in holding its own in spite of circumstances and through variation of process in detail. But whether it proceeds through conation or by purely mechanical actions, the development of the physical organism is definitely limited, its mature form is something prescribed by its original constitution in relation to environmental stimuli and it does not go beyond these bounds. There is no further development except through a new synthesis.

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[1] In the normal course of things this is one cause of the difference of individuals. Some environmental changes produce far-reaching modifications of type in the individual, without apparently affecting the germ-plasm, so that offspring reared in the old environment are of the old type.

Such synthesis occurs on the biological plane as already remarked in all reproduction, and though normally the child is recognisably of the same type as its parents, and though biologists are still puzzled—perhaps more frankly puzzled than of old—to say how it is that changes in the type itself come about, they remain generally convinced that they do in fact come about and over long periods sum up to great things. I call each change a new synthesis, for though the actual departure may be traceable to variation in a single factor, that variation must be assimilated by the organism if it is to live, *i.e.* there must be such readjustment of other elements as will harmonise the new with the old.

6. But there is another kind of synthesis, which as we reach the higher organisms becomes increasingly important. On the lower levels each organism proceeds in the path of its development, just as each member of a mechanical structure moves in the orbit marked out by the conditions of the structure, without regard to its effect on other organisms or other structures. Hence discord, disorder and, at a higher remove, the pain and suffering which are disorder rendered in consciousness. There is, however, from the first this difference between the organism and the mechanical structure, that the organism can adapt itself within limits that gradually expand to new circumstances, guard against dangers, and even in some degree remodel itself so as to avoid or to soften the shock which would otherwise destroy it. It is not regardless of the foreign body so far as the effects on itself are concerned. It is, however, so long as it is fully separate, regardless of its own effect upon the others. Hence the clash of organic forces and the struggle for existence. But among the many variations by which the organic type is modified is one which eventually becomes of superlative importance. The mind factor, always striving to assert itself, advances by steps and introduces a new form of synthesis. In the first place it correlates the successive acts and even the divergent impulses of the individual, essentially, as shown earlier in this volume, by bringing into review the underlying forces which have previously moved it without its knowledge. It thus brings a certain harmony into disconnected and discordant elements of behaviour. In the second place it recognises its relation to other organisms, becomes sensible of the underlying unity which binds it to them, and again substitutes harmony for the clash of egoisms. The advance must necessarily be fitful and uncertain as long as the action of mind is dependent on conditions beyond its knowledge and control. But, as has been remarked in a different context, there is this general condition making for harmony, and therefore for development, that so far as organisms, or indeed any structures, come into conflict, they tend to arrest, cancel and destroy one another, while conversely, so far as har-

mony extends, they tend to maintain and further one another's development. By repeated modifications and synthesis upon synthesis partial and imperfect harmonies, shot through with discord, are purged, united, and made complete.

7. We have thus reached an answer to our main question. Development in general is the extension of harmony.[1] In the undeveloped state forces are locked in conflict and cancel one another. There is mutual arrest and stagnation. In the developed state of Reality they co-operate in the maintenance of a harmonious system. The method of advance is by the liberation of elements from inhibition and the synthesis of disengaged elements with one another. And the permanent underlying motive power is the operation of Mind. The first act of development is such a loosing of locked forces as sets some elements of energy free to express themselves in a definite series of changes, but if this is true development and not mere disruption the forces set free still remain related. They act on one another only not so as to cancel one another, but so as to engender the correlated movements of an orderly structure. This is the second act.

Structural order, however, is in general quite mechanical in its operation, but at some point or points the organising efforts of mind succeeds in absorbing mechanical elements into its system at the cost of the differentiation by which it is limited and confined by that which it absorbs. This synthesis constitutes the organic being, at once psychical and physical, maintaining and propagating itself by plastic adaptation to requirements, growing by the absorption and extending its power by the subordination of foreign elements of physical energy. This is the third act. The organism still acts indifferently, *i.e.* mechanically, on the outer world, including its fellows, until the mind element within it, enlarging its scope by continued effort and taking advantage of favourable conjunctions, seizes at length on the underlying reality of its unity with its fellows and the possibility of a harmony of life. The individual mind then becomes aware of the conditions which have made it what it is and of the ultimate meaning of its own efforts and emotions and the harmonious development of life then becomes the object of intelligent purpose. The emergence of this purpose in the human mind constitutes the fourth, and its fuller definition and execution the remaining, acts of the drama.

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[1] As opposed to the development of a particular thing, which means simply the more complete realisation of that thing. In the case of Mind, as that which is based on a harmony and is the basis of a fuller harmony, the two meanings express different aspects of the same process, the fuller realisation of the potentialities of Mind being effect and cause of a deeper and more extended harmony.

Lastly, as has been shown above, harmony is not only a product but a condition of development. Any structures which are incompatible with one another must cancel out and destroy one another as they come into contact, and all the lower organisms which are mutually indifferent structures are thus destroyed in immense numbers. In the harmonious whole, on the other hand, the elements instead of cancelling maintain one another, and if the whole consists of organisms each capable of development the harmony involves mutual furtherance of such development. At the same time it must be observed that related organisms may have each more than one possible line of development, and that among them those which conflict will destroy one another, while those that harmonise will survive. Thus (1) a harmonious whole has an advantage over others, and (2) a partial harmony tends to become a complete harmony. In both ways harmony is a self-multiplying process, and though a higher unity is always liable to destruction by lower ones which it has not incorporated, yet over long periods the permanent make-weight has its effect, and there is a progress of development, which is complete only when the whole field of reality is subdued to the needs of a single organic whole.

8. In this account two points will have emerged which constitute the main problem of the study of development. The first is, that development in general, the extension of harmony in reality as a whole, is constituted by a great number of developments of structures and organisms

formed within reality, which structures are in large measure independent and in their development largely indifferent and even hostile to one another. The second point is that as development goes forward the conditions on which it rests undergo a change. The growth of mind in organic beings effects the correlation between them. Their relations to one another and eventually to the whole become objects of definite thought to the parts and the development of the whole an End governing the individual life. Thus the earlier and later stages of development in general seem markedly opposite in character. In the beginning there is multiplicity and indifference, and it is difficult to state the conditions of development without using phrases which seem to imply accident and casual combination. Later on the whole process appears unified and purposive. So reading the account it almost looks as though the comprehensive purpose itself only emerged by a kind of chance from the clash of separate forces or was adopted of necessity as the alternative to mutual destruction, as the Hobbesian sovereignty was the refuge of men hunting or hiding from one another in the state of nature. But such an interpretation would err against every principle of science. In reality as a whole there is no chance; that is, there is nothing without its ground, and for that reason also there is no complete and absolute indifference of elements; rather, indifference is itself a factor countered by another factor which is the ultimate dependence of each thing on one and the same system. Development lies in the gain of the one factor over the other, which again is no miracle but is due to the circumstance that this factor is conational and seeks from the first to assert itself. Throughout the process of differentiation it secures what we called at lowest a minimum of compatibility, and its work is to transform it into a maximum of positive and thorough going harmony. But the further we go back in its history the more narrowly is it conditioned by the factor of mechanical indifference, and as far as our experience goes it first begins to get the better of this factor only within the narrow limits of the physical organism. Again, the first formation of the organism looks like something either casual or miraculous and its life and evolution as something individualistic. But neither of these aspects gives us the whole of the case. The elements of the organism, as we saw, must be pre-existent. The conditions of its genesis and the possibilities of its life involve the whole evolution of the astronomical and geological order, all parts of the one comprehensive system of the universe. The fortunes of living things, when we have given its full due to the vital impulse within, rest on their relations to the environment. If they struggle with one another for existence they also stimulate and unconsciously co-operate. They do not create the conditions of their existence but find them, or at lowest find conditions which they can mould. Hence that ultimate unity in evolution on which we insisted above. At every stage of advance, we will not say the plan but the ground-work is already there for the movement to lay hold of it and fashion to its needs. More emphatically is this the case with that underlying unity of mind on which the transformation of development into a fully teleological process is based.

Thus though the harmonising principle first asserts itself with success in individual organisms, and though their life appears self-centred and their development (if we may apply the political expression) Particularist, yet each organic life is only the relatively advanced, yet partial, application of a principle which is working on the cosmic scale and is dependent on this larger operation for whatever success it enjoys. The converse truth remains that in all the extra-organic relations, if we may so term them, the harmonising principle sticks at its lowest point, and it is through the extension of organic life by synthesis upon synthesis of organic unions that it wins its way. Moreover, on the principle of harmony, the constituent elements of the syntheses have their permanent value. They cannot be altogether reduced to the position of mere instruments. Harmony is not subordination; it is completeness of expression, for all parts of the whole, to the utmost extent of their mutual compatibility. This is the governing principle of development from the beginning and is the reason of its infinite difficulty. If it were only a question of a single mind dealing with a plastic and indifferent matter, development would go straight forwardly. It would lie in the continuous extension of order. In reality it is rather a question of finding scope for all striving elements in mutual compatibility, a liberation as well as a co-operation, and in this process every liberation is a new problem and disturbs its established equilibrium. This truth becomes clearer and more important as we get higher in the scale, and the working out of the higher harmony is not to be supposed to run easily like a well-oiled machine, but to make the largest call on the energies of the individual minds by which it is sustained. Thus, while the process of development comes more definitely under unitary direction, we are not to suppose that its problems are simplified.

So much it is necessary to say of harmony by way of caution. At this stage of the argument, however, our main result is, that though the harmonising principle effectuates itself in organic nature, and though its progress takes place by synthesis upon synthesis, it would be a mistake to regard the syntheses as isolated and self-determined advances involving no interrelations. On the contrary they rest on and take advantage of a more comprehensive co-ordination of elements which indeed they also on balance carry a little further, thus levelling the way for further synthesis in due season. It is equally a mistake to regard the development of united purpose as anything but a development. It is not a totally new fact, but it is a turning point in the onward effort of a principle coeval with a differentiated universe (if to such a universe time categories are applicable at all).

9. Nor is the unity of mind a new fact. It is not created but discovered in the development of individual minds. As a reality, it is that which determines development from the beginning. Yet the nature of this unity presents a problem which it should be acknowledged is as yet imperfectly solved. We infer a Mind at the root of the structure and more especially of the development of

Reality, functioning, that is, in Reality at large and functioning as a unity. But the minds of our experience, our own and others, are very limited entities, functioning in bodies, with limited powers, and partial aims. We were indeed ready to conceive of the first formation of the limited psycho-physical individual as an intimate synthesis of a mind element with mechanical elements, and this would fit in with the conception to which we were led independently of a mind element penetrating Reality as a whole as the complement of the indifference and self-centredness of other elements. This might suggest something like the Mind-Stuff of certain theories except that our mind does not exist in scattered atoms but is a factor in all process, and we could conceive portions of the Mind-Stuff amalgamating with mechanical elements to form the individual living being. But the difficulty is that our theory postulates something more than the elements or stuff of mind. It postulates a working unity, functioning throughout the process of things ages before organic life appears, at least in this world, and the minds of organisms are among its products.

When we seek to conceive such a mind in some concrete form we have to draw upon the models supplied by a partial experience, and the danger is that instead of expanding the model to the measure of the broad principles which it is to embody, we may force the concept into the mould we take ready made. There are in fact two kinds of unity in the mind world of our experience. There is first the unity of personality, which in our experience functions continuously in a physical organism and unites many psychical and physical elements into a distinctive whole. This conception cannot be applied to the Central Mind without considerable modification, for (apart from any difficulty about the physical organism) the note of personality is its individual exclusiveness. No matter how close inter-personal relations may be, in the nearest and deepest love it is of the essence that there are two centres of being that feel and think and throb with emotions each their own, however completely they may mirror one another or strain towards one another. What we are looking for is the element of unity in mind ; either, then, a unity which all minds constitute or an element common to them all. This brings us to the consideration of the second form of unity in mind which experience reveals—the unity which interconnects minds in beings which each possess a mind. Of such unities there are many species. Any group of human beings that are at all closely related forms a more or less compact and durable unit—a family, an association, a state, a church—composed of constituent units which themselves are minds interconnected, interacting by mental processes, by feelings, thoughts, imagination. Familiarly we use expressions which suggest that the whole is itself a mind. We speak of the soul of a nation, the spirit of the period, the common sentiment of a class. Humanity itself has been conceived as the Great Being that lives and learns without dying. These are in fact expressions for a form of unity which we appreciate as something very real and important but which we have great difficulty in defining in precise terms. Now whenever we are confronted with a reality of such a kind there are two opposed fallacies to which we are liable. On the one side we may overstress the metaphor, take the form of expression too seriously ; in fact, exaggerate the partial into a complete identity. In the present case this results in regarding the kind of unity which binds persons together as itself a super-personality, ignoring the essential differences. On the other side, recoiling from any appearance of mysticism, we refuse to acknowledge the very existence of that which we cannot satisfactorily label, which means in the present instance that we undervalue or even ignore the real and often subtle and obscure bonds that unite mankind. Men do form unities, not one but many, and even of many different types, some much more deeply rooted than others, some wider, some narrower, some even cutting across and conflicting with one another, as, *e.g.* the religious bond may cut through the national. All these unities are real and many of them powerful. Also, they bear some resemblance to personality, for in them we encounter psychical elements which meet and strive and may conflict, and may also harmonise and give continuity of character and development. Yet they differ essentially from any personality in the fundamental point that they rest on the relations of units that are themselves personalities.

Moreover, what is important for our purpose, the social group itself has elements of contingency in its composition and behaviour which separates it sharply from that principle of fundamental unity which we are seeking. Even groups of great importance like the nation are formed by a complex of causes wherein any of the variables of history may play a part. The closest ties of individuals may be disrupted and yet they find themselves, perhaps to their own dismay, still living, still centres of feeling and thought. It is not the actual social unit that is fundamental, it is the principle operating in all social relations finding expression in the various forms of union, inspiring every effort of co-operation; the principle which, when we identify ourselves with it freely, we feel as love, and which when we are reluctant, imposes itself upon us from within as moral obligation. The rational being, *qua* rational, has this element within him which is the organic filament uniting him with the whole that is Mind. It is not to be identified with family or state or church or any concrete unity or association of mankind, but is the principle of co-operative or harmonious life within any and all of them. Nor is it born with any of them, nor does it die, but their birth is the discovering of some new form which it can take, and when this form perishes from the clash of individualising efforts, which the principle has failed to control, it sets to work on new creations.

This principle then accords with our conception of personality in that it is a permanent spiritual activity, moulding the elements by which it is conditioned to ends which are the complete expression of its own nature. It differs, in that it is not embodied in a separate physical organism and therewith in a centre wherein it lives confined and exclusive of all others. It pervades the world structure conditioning and conditioned by its medium. Individual minds are in a sense its products or creations because they come into being in the course of its efforts to harmonise the otherwise divergent and incoherent elements. They are also in a sense its constituents or, as certain forms of religious thought like to phrase it, participators in its being, for in them it is realising some fraction of itself. But Mind does not stand outside the world structure and mould it as the potter his clay, but is in it struggling for expression, and its expression in the individual mind reveals the play of the particular, the discordant, the self-centred element no less than the 'unifying spirit.' Thus the individual mind cannot be taken simply as a constituent of the universal or Central, nor the Central as the whole system of minds taken together. The universal is rather a common factor in the growth and being of all individual minds, which they come gradually to recognise as they mature.

All such expressions must indicate the extreme imperfection of any terms that we can use in attempt to conceive Reality as a whole or any of its fundamental principles. This is the inevitable consequence of the materials and the instruments at the disposal of our thought. Our concepts are the precipitates of partial experiences to which there is always a background, and none of them can possibly be applied to the whole without the modifications involved in the removal of their external limiting conditions. But we are not necessarily driven to a position of sheer agnosticism; our thought must be tentative and experimental. To be dogmatic here is to have the lie in the soul, but if we use its logic aright there is no reason why, here as elsewhere, experiment should not find its reward.

One caution is indeed required. The Mind that we are led to contemplate must neither be confused with the whole of things nor with an Omnipotent Creator of things. It is not the whole, for mechanism—the antithesis of purpose—runs through the structure of the whole, and in dependence on mechanism, discord and evil. It is not, therefore, to be confounded with the Absolute or Unconditioned of Metaphysics. If these terms have meaning, they possess it only as applied to the whole, and in the whole Mind is only a factor. It is conditioned as its Purpose is conditioned. For the same reason the Mind to which our argument points is not the Omnipotent Providence of a more elementary religious theory working at its will in a void or on a material of perfect plasticity. The reality of evil must be recognised as something very different from a mere privation of good. It is the positive result of the clash of processes, and of purposive processes, too, that are not organised. Its extent is the measure of the incompleteness of the order actually achieved by Mind in the world.

10. It may be reasonably asked whether even this statement is exhaustive. Can the catastrophes of earthquakes and floods, the more loathsome diseases, or the extremes of moral turpitude find their place in a structure which is the work of a comprehensive mind aiming at perfect harmony? On this point it may be remarked (1) that it is not here suggested that every event is good, but only that every event proceeds from some combination of forces, which are constituent parts of the structure formed by mind in its wrestle with mechanical elements. The evil that arises is the price paid for the harmony gained, and that this price has to be paid is the proof of the limitation of purpose, not of its non-existence. This being understood, the very fact of the callousness of nature is the best testimony to the general account here offered of evil, that it is the outcome of the blind operation of mechanical forces. (2) In relation to moral evil it is sufficiently clear, with regard to the mass of normal wrongdoing, that it is the result of the pursuit of partial ends without regard to the effect on others. Selfishness of the individual, or selfishness of the family, class or society is at its root, and the characteristic of all such selfishness is that while its end may as an end be blameless and even laudable, it is its limitation that makes it bad by impingement on the equally just claims of other individuals or groups. Here again evil is simply the result of the inorganic relation of human beings or human societies. There remain the cases of monstrosity, of cruelty, treachery and aggravated lust. These, which seem to a simple and unreflective experience to be clear evidences of a Satanic Mind, are more and more

clearly reducible by psychological investigation to pathological growths, by which the normal mental structure is obsessed or distorted. Impulses that are natural and necessary acquire a morbid predominance, or take a perverse twist, and this again is due either to an unhappy combination of hereditary tendencies in the constitution of the individual, or to the destructive operation of experiences to which the character has been unable to adapt itself. It is only in melodrama that men are all-round villains glorying in their villainy. The tragedy of actual life is that under the stress of overwhelming temptation or mastering impulse men do vile things who in their normal selves are sufficiently good members of society.

11. Thus from two opposite starting-points we have arrived at the conception of a conditioned purpose as constituting the core of the world-process. The analysis of thought points to the conception of the Reason as an impulse to secure harmony of conceptions, an impulse which can only be finally validated by development. The analysis of the ethical consciousness points to a goal of effort in which the harmony of all conscious life is to be attained. When, further, the postulates of rational thought are carefully examined, they suggest that this harmony is not a mere ideal, but a just description of the goal to which the movement of the world tends, and this leads us to infer a power of the nature of Mind operating under conditions towards the effectuation of a world-purpose. But it is precisely to this point that we had been led independently by the synthesis of experience. The theory of evolution began with the biological order. It showed first how all forms of vegetable and animal life might be conceived as issuing from a single origin. This conception is now undergoing extension at both ends. Physical science is extending the principle of development to the inanimate. It is coming to regard not merely the specific forms of matter as variants of a common original, but matter itself as a structure evolved from a more primitive source. On the other side psychology and sociology are busy exhibiting the higher forms of the superorganic world and

tracing the phases of development experienced by the individual and the social mind. There are doubtless great gaps remaining in the scheme. In particular, the transition from the inanimate to the animate is not made out, and can only be tentatively imputed to a synthesis on the analogy of better known cases of the appearance of a new kind. But there is no reason to doubt the substantial validity of continuous development as connecting the lowest with the highest orders of being. The principle object of our enquiry has been to determine in what development consists, and here, as the result of a purely empirical synthesis, we were led to the conclusion that it consists in the growth of Mind. To measure this growth we distinguished a succession of phases, and we found that in each phase the transition was effected essentially by the gathering into the scope of purposeful mental activity of conditions that were already in operation from without at the lower phase. The highest known phase we decided to be one in which the mind of humanity, grasping the conditions of its own development and the true goal of its action, opened to itself the prospect of dominating the actual future of the race and securing the harmony which is its ideal. That this prospect was not a bare idea, but rested on real conditions rendering its realisation possible, we showed by the consideration that development in general rests upon harmony, and arrest upon conflict and incompleteness of organisation, and that in the rise of mind-power to the point in question the general condition necessary to the completion of harmony and avoidance of conflict was fully given. We could not, however, on this ground decide on the position of the mind of humanity—a product of one planet of our solar system—in the world, and for this reason, if for no other, we had to enquire what general considerations applying to Reality as a whole could be brought to bear upon the problem. Starting from these general considerations, we were led to infer a development precisely parallel to that which our synthesis had yielded—a development of harmony which constitutes the gradual realisation of a conditioned purpose.

In one point indeed the deductive argument does not at first appear to square with the empirical conclusion. It leads us to conceive the operation of Mind as permanent, whereas the facts of development point rather to its gradual evolution. But on closer inspection the discrepancy disappears. For (1) as hinted at an earlier stage of the argument, if we persevere with the organic conception, we must regard the central mind[1] itself as undergoing development. If it is conditioned as well as condition, it must be limited by the constitutive elements of the Real unity, and in so far as it has not dominated them, must be dominated by them. Its evolution, in fact, proceeds through those processes of organisation and synthesis which have been indicated here, and which correspond, in general tendency, with the stages of development revealed by the empirical synthesis. Accordingly, (2) Mind, as we know it empirically, whether in the individual or in the group, is the product, and so far as it is truly mind, is deservedly reckoned a true constitutive part of the permanent mind. Its existence depends on mechanical conditions, on a cerebro-neural structure for one thing and on complex physical and social relations between individuals for another, the shaping of which is precisely the work at which a mechanically-conditioned purpose is for ever busy. Thus Humanity, in the sense which the best Positive writers have given to that word, Humanity as the spirit of harmony and expanding life, shaping the best actions of the best men and women, is the highest incarnation known to us of the divine. If, indeed, we come to the conclusion that God is, and are asked what He is, we may reply that God is that of which the highest known embodiment is the distinctive spirit of Humanity. And of this account of the relation of the empirical to the central mind there is in the empirical account itself more than a hint. For at each stage we have shown that the conditions of a higher stage are already present. It is not the mere empirical mind itself that works out its own progress. It is the empirical mind operating upon other conditions of progress that are already laid down. The human mind is a germ for whose maturity provision is already made. Furthermore, at the highest known phase of development we say that the mind comes to realise itself, that is, to realise what are the fundamentals of its structure as it has been all along. In this new consciousness it discovers a unity underlying the differences and divergences of life and a plan containing the possibilities of a future self-realisation. It does not invent this unity and this plan. It discovers them. It finds that they are already there, and have been among the conditions operating to determine its growth from the earliest stages. Its own purposeful activity is merely the continued operation of these conditions completed by the unifying link of the consciousness of their significance. Hence, if the mind does not directly through the religious consciousness become aware of its relation to a greater Spirit, it does have to recognise the existence of conditions appropriate to the operation of such a Spirit, and to admit in its own history a process in which such conditions are working out their natural results.

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[1] It follows—in opposition to a more mechanical teleology—that the Purpose operating in evolution is itself not fully defined from the beginning, but susceptible of development.

Thus, broadly viewed, the two lines of thought are in close agreement. Both lead us to conceive the world-process as a development of organic harmony through the extension of control by Mind operating under mechanical conditions which it comes by degrees to master. The empirical synthesis is in the main limited to the history of mind upon this earth, and to the stages by which intelligence makes for itself a vehicle in the physical organism. The deductive argument exhibits this process as a part of a vaster and more significant evolution. But the strength of the position is that, so far as the two arguments cover the same ground, they coincide in the main lines of their teaching. The conclusion which they yield by no means answers all the questions that men ask of experience. But, if it is sound, it does settle the fundamental questions—whether the life of man is full of hopeful purpose or void of meaning, whether he can recognise in the constitution of things something that meets his hopes and answers to his aspirations, whether he can make for himself a religion without self-deceit, whether he can finally improve the condition of his race by effort or is doomed always to fall back from every apparently forward step, whether he can trust to his reason or must admit the ultimate futility of thought, whether the spirit of human love is justified of her children or blood and iron must continue to rule the world. To all these questions the conclusion here reached supplies a definite and a positive answer. It is, however, maintained here, not as something which is to satisfy all emotional cravings or end all intellectual doubts, not because it is artistically complete or even because it is proved with demonstrative certainty, but merely on the humble and prosaic ground that, on a complete and impartial review of a vast mass of evidence, it is shown to be probably true.

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